

COMPUTER SERVICES MARKETS IN EUROPE

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COMPUTER SERVICES MARKETS IN EUROPE

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COMPUTER SERVICES MARKETS IN EUROPE

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I INTRODUCTION



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I INTRODUCTION

- This report describes computer services markets, particularly the interactive and remote batch services markets, of the following major European countries:
 - United Kingdom
 - West Germany
 - France
 - The Netherlands
 - Belgium
 - Sweden
 - Italy
- The study was carried out based upon:
 - INPUT EUROPE Computer Services company files on services suppliers in those countries.

- Work completed (UK, West Germany, France, Italy) and in progress (Netherlands, Belgium, Sweden) to establish INPUT's European Company Analysis and Monitoring Service (CAMP/Europe).
 - . All of the CAMP/Europe data was collected via telephone interviews followed up with a mailing of the data gathered for confirmation. Major companies were visited in person, usually the top ten suppliers of each market.
- Company (supplier) revenues are all based on 1977 results since the vast majority of 1978 results are yet to be completed.
- Communications costs are for 1977 in all major countries (UK, France and West Germany), updated by telephone interviews with the PTT representatives in each country.
- Comments and inquiries from clients using this report are invited.

II EXECUTIVE SUMMARY

II EXECUTIVE SUMMARY

- The European market is a heterogeneous mixture of unlike markets, environments, competitors, prices and practices. The only aspect that doesn't vary too widely is the user needs, although the emerging awareness of these can occur with a two to three year delay from one market to the next. Nevertheless, some general trends are apparent in the European market as a whole.

A. EUROPEAN MARKET OVERVIEW

- The Remote Computing Services market in Europe must be reviewed in the context of the entire market to show its relative size and growth and also by country to show the disparity in strength of the country markets themselves.
- Over the 1976/1977 period, interactive timesharing services grew 26% on average in Europe, with the individual country markets ranging from 11% to 30% growth. Over the same period remote batch services grew far less, closer to 9% overall, and in a range of 8% to 19%. Results are presented in Exhibit II-1.

EXHIBIT II-1

EUROPEAN COMPUTER SERVICES MARKET SIZES, 1976 AND 1977

COUNTRY	1976 (\$ MILLION)				1977 (\$ MILLION)				GROWTH			
	RCS		BATCH	OTHER*	RCS		BATCH	OTHER*	RCS		BATCH	OTHER*
	IA**	RB**			IA**	RB**			IA**	RB**		
FRANCE	\$38.0	\$116.0	\$206	\$156	\$516	\$48.0	\$125.0	\$227	\$198	\$598	26%	8%
GERMANY	15.0	70.0	242	128	455	16.7	81.3	270	167	535	11	16
UNITED KINGDOM	41.0	71.0	170	115	397	53.0	75.0	190	150	468	29	6
ITALY	13.3	22.8	191	91	318	16.1	24.9	211	118	370	21	9
SWEDEN	8.5	42.5	129	55	235	11.0	47.0	140	70	268	29	11
NETHERLANDS	11.9	34.0	96	55	197	15.0	38.0	102	68	223	26	12
DENMARK	5.0	24.0	97	40	166	6.5	26.5	106	52	191	30	10
BELGIUM	8.7	21.3	51	25	106	11.5	25.4	56	33	126	32	19
OTHERS	17.6	67.4	77	52	214	22.2	68.9	89	56	236	26	2
WESTERN EUROPE	159.0	469.0	1,259	717	2,604	200.0	512.0	1,391	912	3,015	26	9
											10	27
											16	16

SOURCE: CAMP / EUROPE

* SOFTWARE PRODUCTS AND PROFESSIONAL SERVICES

- An increasing load of time critical applications is driving the expansion of the interactive market (and the development of the software related thereto).
 - Remote batch is not as attractive a user alternative and is growing at a slower rate.
 - A further development, on-site minicomputers connected to a network for off-loading peak work demands, will not change this picture from the remote batch services standpoint. Users are indicating their requirement for immediate on-line processing, not the deferred processing inherent in remote batch.
- There is increasing justification for creating a third category within the RCS market: combination processing or the mixed use of programmable hardware for local data processing plus telecommunications access to the RCS vendor's host computer. The RCS vendor markets the total system. INPUT will monitor this development and, if appropriate, will define a category in future studies.
- Meanwhile the professional services and software products market is booming at 27% growth overall (in 1976/77), ranging as high as 32%. This is where much of the industry's new talent is being absorbed, particularly with the explosion of turnkey minicomputers from all sources, including IBM.
- As an order-of-magnitude, the European computer services industry employs around 135,000 people, each producing, on average, \$22,000 in revenues. Allowing for an average annual increase of prices of 5%, by 1982 these same people should be producing \$29,000 each. By the same token there will have to be 210,000 of them, an increase of 56% over 1977 and an annual increase of staff in the industry of 9%.
 - Actual inflation rates vary widely from country to country, and price changes will vary also from the 5% figure mentioned above.

- Recent inflation rates in the countries covered are presented in Exhibit II-2.
- This is the crucial factor in all of the vendor growth plans - finding (and keeping) the right people. Already in Europe there is a shortage of good staff. Where will this extra 75,000 people come from? This is a key question for managements to address

B. COUNTRY MARKET GROWTH

- 1977 was a very good year for interactive services. France, the U.K., Sweden, Belgium, and the Netherlands were the foremost growth markets for interactive services in 1977. Belgium grew by 32% (on a small volume of \$8.7M in 1976), while the largest interactive market, the U.K. grew by 29%.
- West Germany and Belgium grew the fastest in the 1977 market for remote batch services, while the largest market (France) marked time with a below-par 8% growth. In the U.K., remote batch services grew even slower, at 6%. To a certain extent this is due to two vendors, UCC and CDC, prime suppliers of remote batch apart from IBM; both had their problems. In contrast, all of the interactive services vendors achieved very healthy expansion.

C. OUTLOOK FOR THE PERIOD 1978-1982

- In 1977 the Western European computer services market topped \$3 billion for the first time and was growing at an overall rate of 16% per annum. While growth is expected to slow slightly over the 1978-82 period, the market will nevertheless double in size, reaching \$6 billion by 1982, as shown in Exhibit II-3. All figures in Exhibit II-3 are in "constant" 1978 dollars because of the widely different inflation rates in each country, as mentioned earlier. Actual

EXHIBIT II-2

COMPARISON OF U.S. INFLATION RATES OF CONSUMER PRICES AND RATES IN SELECTED EUROPEAN COUNTRIES

COUNTRY	INDEX (1975 = 100)		
	1976	1977	1978 (FIRST QUARTER)
FRANCE	109.2	119.6	125.5
GERMANY	104.5	108.6	110.7
UNITED KINGDOM	116.6	135.0	141.4
ITALY	116.8	136.6	146.8
SWEDEN	110.3	122.9	132.6
NETHERLANDS	108.8	115.8	118.4
BELGIUM	109.2	116.9	120.8
DENMARK	109.0	121.1	121.9
UNITED STATES	105.8	112.7	116.9*

* FEBRUARY 1978.

SOURCE: INTERNATIONAL MONETARY FUND
INTERNATIONAL FINANCIAL STATISTICS, MAY 1978

EXHIBIT II-3

EUROPEAN COMPUTER SERVICES MARKET FORECAST, 1978-1982

COUNTRY	1978 (\$ MILLIONS)				1982 (\$ MILLIONS) ***				AVERAGE ANNUAL GROWTH RATE 1978-1982	
	RCS		BATCH	OTHER* TOTAL	RCS		BATCH	OTHER* TOTAL	RCS	
	IA**	RB**	IA**	RB**	IA**	RB**	IA**	RB**	IA**	RB**
FRANCE	\$60	\$135	\$250	\$251	\$696	\$142	\$170	\$366	\$613	\$1291
GERMANY	19	94	302	217	632	33	159	475	287	954
UNITED KINGDOM	68	80	213	195	556	166	113	323	476	1078
ITALY	19	27	232	151	429	24	30	316	293	663
SWEDEN	14	52	153	89	308	34	76	216	217	543
NETHERLANDS	19	43	108	84	254	46	63	136	199	444
DENMARK	9	29	116	68	222	22	43	164	166	395
BELGIUM	14	30	62	44	150	33	47	91	115	286
OTHERS	24	68	94	59	245	63	87	153	144	447
WESTERN EUROPE	246	558	1530	1158	3492	563	788	2240	2510	6101

* SOFTWARE PRODUCTS AND PROFESSIONAL SERVICES

** IA = INTERACTIVE, RB = REMOTE BATCH

*** 1982 DOLLARS ARE EXPRESSED AS "CONSTANT" IN THAT NO INFLATION FACTOR IS APPLIED; "CURRENT" 1982 DOLLARS WILL BE HIGHER, DEPENDING ON THE INFLATION RATE, COMPETITIVE ENVIRONMENT, AND PRODUCT MIX IN EACH INDIVIDUAL COUNTRY.

growth will, therefore, be higher than the 12% average rate shown, actually approaching 15%. This compares to a U.S. market growth rate for the same period of 16% as forecasted by INPUT based on research done in the United States.

- As already stated, it may have become necessary by then to redefine remote batch services and interactive services. Certainly the growth of combination processing is expected to have created a new market for the vendors of RCS on-site hardware by then. This has been included in the forecast for interactive services in Exhibit II-3 and is the main factor in the decrease in the gap separating remote batch market values from interactive market values.
- This development is not expected to have any major impact on batch processing, which will be just as difficult a market to bury as the punched card has been as a data capture medium.
- The greatest growth will come in professional services and software products, which, taken jointly, will have exceeded the value of batch processing in Europe by 1982. Compound average growth of 27% is expected throughout the 1978-82 period.
- There is some danger of the computing services (interactive and remote batch) going the same route as the equipment manufacturers; namely, that the proliferation of vertical branch-specific markets will exceed their ability to serve them, leading to a situation where the customization of timesharing technology (for example) to a particular user needs could become the responsibility of a specialized third party vendor adept at programming branch-specific applications using a given interactive language.

D. NEED FOR MARKET IDENTIFICATION

- In section IV of this report, the problems facing vendors wishing to gain entry into European markets are discussed. The problems facing them are identical in nature (though not in scope) to those facing today's vendors in their own markets. For as the markets change, through evolution, it is necessary for each vendor constantly to re-define his goals and role in that market, in the same way as he would when approaching an entirely new opportunity such as a foreign market. Certainly if he stands still long enough, his own market will become foreign to him.
- Therefore, just as "entry into Europe" should not be the company goal, a goal of "Interactive Services to the French Market" is vague and difficult to structure in terms of marketing and product plans.
- For any country market, once the prospective branch targeted is chosen, the applications choose themselves, as do the optimum languages needed. In the same way, the next 10 years will require of each vendor present in the market that he define and re-define constantly the services he is offering and the sectors he is aiming at.
- This may sound expensive, but it is highly rewarding in that as the services offered become more and more specific, the competition becomes less and less, making the client base more and more captive.

E. STRATEGIES AND RECOMMENDATIONS

- In terms of European opportunities, only five markets are worth attention: France, Germany, and the U.K. because of their size, and Belgium and the Netherlands because of their growth and side attractions (international operations, multilingual staff available, tax facilities, etc.).

- End-user pricing considerations are a vital part of any market plan but particularly so in Europe. Typically, a paycheck in the U.K. costs \$.03; in Switzerland \$.25, and in Germany anywhere from \$.25 to \$.35. Countries that command high prices (Sweden, Germany, Switzerland) also tend to demand higher salaries, accommodation costs, telecommunications, etc. The main characteristics are summarized in Exhibit II-4.
- Each country in Europe must be approached with a particular subset of the basic technology, applications and know-how of the vendor, ideally developing local-need applications satisfied by locally developed packages. This cannot be stressed enough in a market where application packages do not travel well across country borders (nothing to do with language barriers).
- For this reason, it is frequently necessary to deliberately adopt an open-minded strategy regarding how a national market should be approached. The strategy should be planned with the total involvement of the national manager hired for that job. There can be clear marketing goals established as to the technology or basic products to be offered; the names and methodology of applying them, however, should be left open for local tailoring.

EXHIBIT II-4

COUNTRY MARKET CHARACTERISTICS

RANK	COUNTRY	RCS MARKET SIZE	END USER PRICING	ACCOMODATION/ STAFF COSTS	COMMUNICATIONS	
					AVAIL- ABILITY	COST
1	UNITED KINGDOM	●	○	○	●	●
2	FRANCE	●	●	●	●	●
3	GERMANY	●	●	●	●	●
4	SWEDEN	●	○	●	●	●
5	NETHERLANDS	●	○	●	●	●
6	BELGIUM				●	●
	DENMARK				●	●

LEGEND: ● VERY HIGH ○ HIGH ● MEDIUM ○ LOW

III MAIN COUNTRY MARKETS

III MAIN COUNTRY MARKETS

A. UNITED KINGDOM

I. OVERVIEW

- The remote computing services (RCS) market is extremely well developed in the United Kingdom and growing rapidly (22% per annum). In 1977, remote computing services revenues were \$115 million, of which \$66 million was for remote batch services.
- A 1977 INPUT analysis of the largest U.K. companies showed that there is still a high number of important organizations spending upwards of \$20,000 per month on EDP services, who are prepared to switch to a competitive service, providing guarantees of reliability are offered and the new service is economically justified.
- The computer services industry in the U.K. is composed of 530 active companies. Over 900 are known to the National Computer Centre (NCC) to have existed at one time or another over the last five years; many have merged or been acquired and appear under different names today. The top ten companies are listed in Exhibit III-1.

EXHIBIT III-I
**THE TOP TEN REMOTE COMPUTING SERVICES
 VENDORS IN THE U.K., 1977**

RCS RANK	COMPANY	RCS SERVICES (\$MILLION)			ALL SERVICES TOTAL (\$M)**
		REMOTE BATCH	INTERACTIVE	TOTAL	
1	IBM	\$10.0*	\$ 5.0*	\$15.0*	\$19.0*
2	HIS	0.2*	17.5*	17.7*	17.7*
3	COMSHARE	2.1	8.8	10.9	10.9
4	UCSL	7.5	2.2	9.7	16.5
5	CENTREFILE	1.7	7.1	8.8	15.9
6	ADP	+	8.5*	8.5*	8.5*
7	BOC	8.1	-	8.1	18.8
8	SCICON	3.5	2.4	5.9	6.1
9	ATKINS-ON- LINE	1.4	4.1	5.5	6.9
10	UCC	5.1*	+	5.1*	10.6*

SOURCE: INPUT CAMP/EUROPE

* = INPUT ESTIMATE

+ = SMALL VALUE

**\$M = \$MILLION

- A large proportion of the remainder have gone out of business, showing the U.K. market now presenting the profile of a market that has achieved a measure of consolidation and maturity. With this maturity has come a period of growth in RCS, where the impact of vendor pressure as a factor in market expansion is clearly visible.
- The U.K. is the hunting ground par excellence of U.S. computer services groups wishing to acquire an operational base in the European market. ADP, On-Line Systems, and Martin Marietta have all established themselves in the U.K. via acquisition.
- Combined with the acquisition strategy of large spin-off services companies like British Oxygen and Unilever, this trend has led to the formation of large, aggressive, multi-service vendors in the U.K.
- The vast majority of computer services vendors (69%) are privately owned. None are quoted on the stock exchange.
- In the last five years, the number of spinoffs (or organizations who set up their EDP departments as separate entities offering computer services) has increased.

2. COMPETITION

- The large number of RCS suppliers already established on the market should not be considered as a deterrent to the creation of a new supplier. The rapid development of the market has more than coped with the expansion of the main vendors, so that the U.K. market is not a harshly competitive environment.
- A factor that is unique to the U.K. market is the degree to which ICL equipment is used for computer services. In terms of hardware share, based on the number of machines installed, ICL has a 40% penetration. In terms of revenue, however, the picture is drastically different.

1977 U.K. AND ICL-BASED MARKET SIZES (\$M)

MARKET	BATCH	REMOTE BATCH	INTER- ACTIVE	OTHERS	TOTAL
UK TOTAL	\$190.00	\$75.00	\$53.00	\$150.00	\$468.00
ICL-BASED	57.0	11.8	7.8	35.0	111.6
ICL SHARE	30%	16%	15%	24%	24%

Due to ICL weakness in telecommunications, the RCS share is far below the batch business. This situation is being improved, notably with the introduction of the 2900 series into the major bureaus (eight at this time). COMPUTEL has begun to generate one-third of its revenue from RCS on its ICL 2960. The largest ICL Bureau, Baric, is 85% batch, however.

- IBM has nearly completed the restructuring of its Data Centre Services and Remote Computing Services (both part of IBM DP Division).
 - An aggressive growth plan is in the early stages of implementation with the super center at Warwick, which can house as many as six IBM System/370 Model 168s tied to a network of 80 high speed lines and 10 concentrators serving the U.K. market.
 - To date, only one 370/168 has gone live with the concentrators switching customers to either Warwick or the existing 370/155s in London, used for the Terminal Business Systems and Call Services. IBM continues to run batch bureaus in Croydon, Manchester, and Birmingham.
- Honeywell Network Information Services is one of the few suppliers to cover the entire country and whose presence is felt everywhere. Honeywell is more concerned with growth than with competition, an indication of the buoyant state of the U.K. RCS market.

- Honeywell has approximately 200 sales and support personnel marketing the DMS and TABOL-based services that make up most of its revenue and would like, ideally, to increase this by up to 150 salesmen, since it feels the business is there to justify this expansion. Currently, the Honeywell salesmen select which leads they will follow every day.
- COMSHARE is treated separately at the end of this report (see "Profile of a successful North American Vendor in Europe"). In the U.K., COMSHARE Ltd. is the prime supplier of interactive services (though not the largest). Growth is anticipated to be 47% in 1978, coming mainly from banking, government and other specialized markets where the value-added can be maximized. This specialization insulates the company from competition to a great extent.
- Centrefile is a major RCS vendor, mainly for interactive services. The company's main strength is its link with National Westminster Bank and the latter's 3,500 branches that serve as a collection/distribution and semi-marketing force for Centrefile's services. Referrals of significant new business come from this network.
 - Centrefile has the Motor Vehicle Registration (SMMT) monopoly, which is bought by all car manufacturers.
 - It also has the Law Society's time recording service license and a near-monopoly of the building society business.
- ADP's main RCS strength in Europe lies currently in the U.K. and Holland through the former Time Sharing Ltd. and Cyphernetics operations, respectively. The combination is currently trading as ADP Network Services International.
- Atkins On-Line has become a significant supplier of interactive services, largely based on OLIVER, a problem-solving language, which produced over \$1 million in 1977. APL, Financial Planning and Engineering services provided the remainder of the \$4.1 million of interactive services. The Atkins group, formerly the parent before the On-Line acquisition, provided \$780,000 in revenues.

- CDC provides mainly remote batch services. In the words of some competitors, CDC is "rarely seen" in competitive situations. The drastic pruning of the Brussels-based European headquarters has unsettled the data services group. The Call 370 service acquired from IBM has been partially merged with the Cybernet service with limited marketing success.
- In-house minicomputers are competition to RCS services and are beginning to cause lost business. Main motivations for the end user to change is lack of expertise available from the RCS supplier when new applications are developed, leaving the way open for systems houses to install solution-oriented minis.
- Value-added networks, available through Tymshare, have had no real impact on the RCS market, as yet, and the U.K. Post Office is determined to see that they don't in the future. The communications links, whatever they may be between the end-user and the services supplier, are government property in the U.K.

3. MARKET SHARES

- The estimated market shares for 1977 revenue for each of the major competitors in the U.K. RCS market are shown in Exhibit III-2.
- The main competition in the U.K. RCS field is between IBM, Honeywell, and COMSHARE. The latter two companies have, in some cases, identical software (e.g., SDRC) such that any improvements in running efficiency result in lower costs to the client base (which can easily change from one supplier to the other). IBM, meanwhile, is restructuring its previously batch processing decentralized centers, bringing them all on-line with a new supercenter in the Midlands.

EXHIBIT III-2

RCS MARKET SHARES OF MAIN UNITED KINGDOM FIRMS

COMPANY	SHARE OF RCS MARKET (%)	
	INTERACTIVE	REMOTE BATCH
IBM	9.4%	13.3%
HIS	33.0	+
COMSHARE	16.6	2.8
UCSL	4.2	10.0
CENTREFILE	13.4	2.3
ADP	15.0	+
BOC DATASOLVE	-	12.0
SCICON	4.5	4.7
ATKINS-ON-LINE	7.7	1.9
UCC	13.4	2.3

+ = SMALL VALUE

4. PRICING

- In the U.K. RCS market, pricing tends to be set by Honeywell who prices its services at a premium to the other suppliers in the market.
- Until recently, market price charges have followed a pattern. Honeywell modifies its prices, followed one month later by COMSHARE, and by ADP Network Services six months later. IBM has not had appreciable influence to date.
- In 1977 this pattern was broken. Honeywell raised its prices, but its closest rival, COMSHARE, did not. ADP also kept prices unchanged.
- Competitor's evaluation of each other's pricing is usually carried out by buying time on each other's systems and running company benchmarks.
- The market is very price sensitive and, as a result, the vendors tend to move in parallel.

5. CUSTOMER DISTRIBUTION

- Before the advent of RCS, suppliers went where the customer base was. An analysis of the geographical distribution of computer services companies as shown in Exhibit III-3 provides a good indication of customer populations.
- Of the major vendors, 80% have their main operational base in London. However, IBM's recent location of their RCS supercenter in the Midlands is ample evidence of the independence of processing location with respect to the customer base served. This center will supply computing power to most of Europe.

EXHIBIT III-3

UNITED KINGDOM VENDOR GEOGRAPHICAL DISTRIBUTION

LOCATION	SERVICE CATEGORY (%)	
	PROCESSING	CONSULTANCY AND SOFTWARE
<u>ENGLAND</u>		
- NORTH	8%	17%
- EAST	1	2
- MIDLANDS	11	17
- SOUTHWEST	2	5
- S.E. AND LONDON	67	54
<u>SCOTLAND</u>	7	3
<u>IRELAND</u>	3	1
<u>WALES</u>	1	1
TOTAL	100%	100%

SOURCE: COMPUTER USER'S YEARBOOK 1977

- The above distribution, therefore, serves to indicate where sales and support offices are needed; i.e., where the main prospect areas lie. The RCS center itself can be located anywhere, providing concentrations are strategically placed to reduce end user line changes.
- Seventy-seven percent of the U.K. computer services industry revenue comes from the private sector, 14% from the public sector (4% from central government) and 9% from clients based outside the U.K. The details are summarized in Exhibit III-4.

6. COMMUNICATIONS

- While Public Switched Network (PSN) lines are relatively costly, leased lines are very cheap and of good quality.
- U.K. networks using PSN lines have a critical cost breakpoint at 56 kilometers, above which line costs are tripled.
- Connection charges are reasonably inexpensive for PSN and S3 quality lines. The costs for both of these are practically the same (see Exhibits III-5 and III-6 for costs and line category definitions).
- T quality circuit connection charges are from 33% (short distance) to 60% (long distance) more expensive than S3 charges. The circuits themselves are from 2% to 20% more expensive than S3 circuits.
- Average delay for obtaining leased line installation is three to four months.
- The post office has just announced a ten year plan to increase telephone penetration from today's 45% (telephone per person) to 80%. Neither Sweden nor the U.S., who have the highest penetration rates (70-75%), attain that rate today.

EXHIBIT III-4

**UNITED KINGDOM VENDOR DISTRIBUTION BY SIZE,
CATEGORY AND OWNERSHIP**

VENDOR SIZE BY REVENUE (\$M)**	NUMBER OF COMPANIES	
	PROCESSING SERVICES	OTHER
< \$0.5	99	225
≥\$0.5 - < 1.0	69	37
≥\$1.0 - < 2.0	26	20
≥ \$2.0 - < 4.0	22	4
≥ \$4.0	18	6
TOTAL	234	292

SOURCE: CSA

OWNERSHIP CATEGORY	PERCENTAGE BY NUMBER
PRIVATE (LIMITED)	70%
DIVISION OF A CORPORATION	18
PARTNERSHIP/PROPRIETORSHIP	7
PUBLIC SECTOR	$\frac{5}{100\%}$

**\$M = \$MILLION

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EXHIBIT III-5
UNITED KINGDOM COMMUNICATIONS COSTS

CONNECTION CHARGES (PER CIRCUIT)			
DISTANCE (KM)	COST (\$)		
	PSN	S3	T
• UP TO 0.8	\$ 29.25	\$ 29.40	\$ 39.20
• 0.8 TO 8.0	29.25	49.02	78.43
• 8.1 TO 16.0	48.75	49.02	78.43
• 16.1 TO 80.0	68.25	68.63	117.65
• 80.1 TO 160.0	107.25	107.84	176.47
• 160 KM	146.25	147.06	235.29

PSN LINE COSTS BY DISTANCE	(\$/HR) DIALED DIRECT		
	PEAK RATE	STANDARD	CHEAP
• LOCAL (VARYING RADIUS)	\$ 1.76	\$ 1.17	\$0.29
• UP TO 56 KM	7.02	4.68	1.17
• 56 KM	21.06	14.04	3.51

NOTE: - PEAK RATE = MONDAY/FRIDAY, 9 AM TO 1 PM
 - STANDARD = MONDAY/FRIDAY, 8 TO 9 AM, 1 TO 6 PM
 - CHEAP = ALL OTHER TIMES
 - PSN = PUBLIC SWITCHED NETWORK

SOURCE: UNITED KINGDOM POST OFFICE
 FEBRUARY 1978

EXHIBIT III-6

UNITED KINGDOM LEASED LINE COSTS EQUIVALENT OF \$/MONTH RENTAL (ANNUAL CONTRACT)

LINE TYPE	RELATIVE COST
• UP TO 1.2KM, COST OF S3 RISES IN 0.2KM STEPS, FROM \$5.23 TO \$13.92 PER CIRCUIT	S3 + A4%
• FROM 1.2KM TO 3.2KM, S3 COST RISES IN 0.4KM STEPS, FROM \$17.06 TO \$24.31	S3 + 15%
• FROM 3.2KM TO 6.4KM, S3 COST RISES IN 0.8KM STEPS, FROM \$26.80 TO \$36.76	S3 + 20%
• FROM 6.4KM TO 9.6KM, S3 COST RISES IN 1.6KM STEPS, FROM \$43.30 TO \$51.47	S3 + 15%
• FROM 9.6 TO 16KM, S3 COST RISES IN 3.2KM STEPS, FROM \$57.19 TO \$66.18	S3 + 13%
• FROM 16KM TO 160KM, S3 COST RISES IN 16KM STEPS, FROM \$98.04 TO \$296.57	S3 + 13%
• THEREAFTER S3 COST RISES IN 80KM STEPS AND COST \$64.54 A STEP.	S3 + 9%

SOURCE: UNITED KINGDOM POST OFFICE
FEBRUARY 1978

NOTE: - S3 AND T ARE QUALITY OF LINES PROVIDED BY PTT.
 - S3 IS USUALLY FOUR-WIRE, T IS ALWAYS FOUR-WIRE.
 - S3 CAN CARRY UP TO 1200 BAUD, HALF OR FULL DUPLEX.
 - T CAN CARRY 2400 BAUD IN STANDARD AND 4800, 9600
BAUD IF REQUESTED. (PSN LINES ARE ALWAYS TWO-WIRE).

- The U.K. Post Office telecommunications group has the largest budget among the Western European telecommunications authorities, spending nearly \$2 billion a year (or \$5.6 million a day) on improvements and network extensions. Its electronic exchange (System X) now under development will nevertheless arrive later than the Swedish, German, and French equivalents.

7. CONCLUSION

- The U.K. offers strong attractions to a prospective vendor of remote computing services with a very strong market demand for such services (both interactive and remote batch with greater demand for interactive).
- Financial services, in the broad sense, absorb the largest proportion of the RCS market.
- Telephone communications within the U.K., while not on a par with the U.S. or Germany, are adequate; line quality is good and costs are reasonable.
- Market education as to what benefits can be achieved from RCS has been largely achieved at the large U.K. company level. Marketing needs to convince prospects of the economic value of the service, rather than explain what RCS is. At the establishment level, however, there is a penchant for the small in-house system.
- A minor, but by no means negligible, factor is that U.K. nationals rarely speak any foreign languages. This is a serious drawback in negotiating business on the continent.

B. WEST GERMANY

I. OVERVIEW

- In 1977, the German RCS market was worth \$98 million of which only \$16.7 million was achieved through interactive services. The strongest market by far was the batch services category, which topped all other Western European country markets in that area.
- There are nearly 1,000 computer services companies in West Germany. The stable nature of the German economy over the past eight to ten years has done little to force consolidation. Add to this the distributed nature of the business community served, and there emerges the picture of a market spread relatively evenly over seven major regions:
 - Stuttgart
 - Hamburg/Bremen*
 - Hannover/Bremen*
 - Frankfurt
 - Munich
 - Ruhr-Gebiet (Dortmund, Essen, Cologne, Dusseldorf, Duisberg)
 - Berlin

*Bremen near enough to both to be served by either.

- Each major town within these areas is served by a large variety of batch bureaus, each with its own specialty and near enough to the local clientele to allow fast turnaround. Germany's communications costs are the highest in Europe and do not encourage the development of RCS.
- For all of these reasons, there are few very large German computer services vendors. Despite the fact that Germany is the largest market in Europe, there are a few sizeable and easily attainable market areas that are not divided between a multiplicity of small companies, all operating locally.
- The structure of the market, therefore, is that of a few large companies (DATEV, FIDUCIA, Mannesman, MBB, Taylorix, IBM) followed by several medium-sized companies (AC-Service, MKD, DVO, Honeywell, etc.) followed by innumerable very small local operations (most of which are privately held).

2. COMPETITION

- The size of the German RCS market is a reflection of its development, not its potential. This is amply demonstrated, in microcosm, by DATEV, which is owned by, and operated for, some 1,500 tax consultants. Programs, terminals, central hardware and operational procedures are all standardized and the business is thriving. Yet the vast majority of DATEV's revenue (\$43.8 million in 1977) comes from batch processing on its two IBM System/370 Model 168s. DATEV has 730 employees.
- Similarly, FIDUCIA is owned by the 342 mutual loan associations (Volksbanken) who use its services, again mostly on a batch basis, with just a quarter of its \$19.5 million in 1977 achieved through remote batch.
- Remote batch processing absorbed \$81.3 million of the total RCS market of \$98 million in 1977. Of this remote batch market, IBM took the largest share (\$16.3%).

- IBM covers the entire German market with 13 computer centers: Essen, Cologne, Hamburg, Hannover, Berlin, Dusseldorf, Dortmund, Frankfurt, Mannheim, Nuremberg, Stuttgart, Munich, and Augsburg. Interactive (APL and CALL 370) is relatively low in demand while batch and remote batch (RJE and TEDIS DB/DC system) are the main services.
- AC-service (UCC's West Germany representation) has also adopted the strategy of covering each local market with an independent computer center. It has five centers in Germany (Dusseldorf, Offenbach, Hamburg, Munich, Stuttgart) and has used this same approach in other markets (e.g., with offices in London, Birmingham, and Manchester in the United Kingdom).
- Several large industrial companies have developed computer services groups that offer significant competition in West Germany. Foremost among these are Mathiesen-Kienzle-Datensysteme (MKD), Taylorix, Mannesman, and Messerschmidt-Bolkow-Blohm (MPB).
- MKD has significant remote batch revenues from an on-line seat reservation and flight scheduling system and from RJE-submitted billing accounting and management information systems.
- Taylorix-Tymshare is a joint venture of Taylorix, a subsidiary of Stiegler Hauser and Tymshare. Taylorix offers financial applications on a batch and remote batch basis, plus professional services. Taylorix-Tymshare offers Tymshare's line of interactive services.
- Mannesman is the internal EDP division of Mannesman A.G. offering technical mathematical systems processing on an interactive, remote batch, FM, batch, and professional services basis. This group is not competitive in the financial applications market.
- MBB offers mainly surveyor modeling, local land mapping, operations research, etc. Thus, while it is a competitor in the remote batch market, it is not for financial applications.

- Honeywell (or more precisely HB-NIS) easily outstrips all other competitors for interactive services and took 33% of the 1977 market. However, the market for interactive is smaller, approximately 30% of the U.K. market even though the remote batch markets are approximately the same size in both countries.
- Honeywell has had markedly less success with its services in Germany than in the U.K. and in France. The current trend of the German market toward small business systems (Kienzle, Philips, Olivetti, Nixdorf) and minicomputers (DEC, HP, DG) doesn't help the development of RCS either. The nature of the market is towards decentralized processing (in-house computers, satellite processing at the limit), not on-line interactive services.
- For the same reasons, the German CDC operation, (more remote batch oriented) fares better in relation to Honeywell than its counterparts do in other countries where interactive services are far more popular.
- The positions of the leading RCS vendors are shown in Exhibit III-7.

3. MARKET SHARES

- IBM holds the largest share of the German RCS market as it does in the batch and software products markets. Germany is IBM's strongest computer services market and computer equipment market, with a degree of synergy between the two.
- In the remote batch market, DATEV will shortly overtake IBM. The conversion of much of the manual delivery/over-the-counter batch business is proceeding at a strong rate, coupled with good growth of those tax consultants that are already on-line.
- The industrial company subsidiaries Messerschmidt-Bolkow-Blohm, Mannesman, Mathiesen-Kienzle-Datensysteme, Taylorix, and Datenverarbeitungs-Service Oberhausen (subsidiary of the German Babcock

EXHIBIT III-7

**THE TOP ELEVEN REMOTE COMPUTING SERVICES VENDORS
IN WEST GERMANY, 1977**

RCS BANK	COMPANY	RCS SERVICES (\$MILLION)			ALL SERVICES TOTAL (\$M)**
		REMOTE BATCH	INTERACTIVE	TOTAL	
1	TAYLORIX	\$24.0	\$ +	\$24.0	\$45.0
2	IBM	12.5*	3.5	16.0*	28.0*
3	DATEV	10.0*	+	10.0*	43.8*
4	FIDUCIA	6.4*	0.7*	7.1*	19.5*
5	MBB (1)	5.7*	0.2*	5.9*	23.7
6	HB-NIS	+	5.5*	5.5*	5.5*
7	AC. SERVICES	3.8*	+	3.8*	9.9*
8	CDC	3.2*	0.3*	3.5*	4.0*
9	MANNESMAN	3.0*	0.3*	3.3*	33.2
10	M.K.D. (2)	2.3*	0.6*	2.9*	8.1
11	DVO (3)	2.9*	-	2.9*	7.6

* INPUT ESTIMATE

SOURCE: INPUT CAMP EUROPE

** \$M = \$MILLION

+ SMALL VALUE

(1) - MESSERSCHMIDT-BOLKOW-BLOHM

(2) - MATHIESEN-KIENSLE-DATENSYSTEME

(3) - DATENVERARBEITUNGS-SERVICE OBERHAUSEN

group) had a combined market share of 22% of the 1976 remote batch market. Much of this work is captive (40% on average) but their financial strength makes them serious competitors.

- The interactive market is for all practical purposes divided between IBM, Honeywell, Taylorix-Tymshare and the much smaller Teledata and Timesharing Telecomputers. Market shares of leading vendors are given in Exhibit III-8.

4. COMMUNICATIONS

- The quality of the German PTT network services is the best in Western Europe and is continually being improved. Quality is expressed as measuring the reliability of the lines provided, speed of support for installation modification, line capacity available for expansion and short delay in obtaining it.
- It is estimated that the German Public Network (PSNO) is, on average, never loaded beyond 80% capacity. The result is that dialed connections always get through (unless the number dialed is busy).
- The importance, to a businessman, of this feeling of "communicability" cannot be overstressed. One only has to try to do business in Italy (where the lines between major cities are always saturated during normal working hours) to fully understand the value of good communications. The frustration caused by faulty communications is bad enough, but not being able to "get through" at all has a disastrous effect on business morale.
- Unfortunately, this very high quality and availability of German communications has a stiff price. PSN line costs are up to two and one half times the cost of the peak rate for equivalent lines in the U.K.
- The cheaper PSN connections are those that use lines that are greater than 100 km long (the longer the line, the better the relative cheapness).

EXHIBIT III-8
WEST GERMAN RCS MARKET SHARES

RCS RANK	COMPANY	RCS SERVICES PERCENTAGE SHARE		
		REMOTE BATCH	INTERACTIVE	TOTAL RCS
1	IBM	15%	21%	16%
2	DATEV	12	-	10
3	FIDUCIA	8	4	7
4	MBB	7	1	6
5	HB-NIS	-	33	6
6	AC-SERVICE	5	-	4
7	CDC	4	2	4
8	MANNESMAN	4	2	3
9	MKD	3	4	3
10	DVO	4	-	3

- Conversely, the leased lines tariff is initially reasonable but gets rapidly more expensive according to the data transmission rate and the distance used. At 2400 bps, the leased line rates in Germany are cheaper than those of the U.K. up to 100km; at 4800 bps they are marginally cheaper up to 100km; at 9600 bps they are more expensive. There is no comparison possible at 48,000 bps.
- Connection charges are composed of two elements: Cost of the first installation and its rental thereafter. This can be quite expensive for a multipoint connection and very expensive for complex networks. Typical charges are given in Exhibit III-9 and III-10.

5. CONCLUSION

- There is no question that the potential of the West German RCS market outweighs all other European markets. To date, this potential has not materialized due to:
 - The availability and variety of local batch services.
 - The successful drive of the domestic (and foreign) vendors of the small in-house business computer and office computer.
 - The high cost of communications.
- RCS competition is not formidable as yet in Germany. Vendors of broadly applicable financial applications have had some success, but not on the scale of the batch vendors. The demand for financial packages is high, however.
- Due to the distributed nature of the customer base (spread over 13 major city centers in all), local provision of services means restricted market coverage. Remote batch services, for this reason, hold the greater promise since they can build on existing batch services while taking advantage of the concentration of workload created by the use of a network.

EXHIBIT III-9

WEST GERMAN COMMUNICATIONS COSTS -
LEASED LINES

CONNECTION CHARGES	\$ COST
● ONE-TIME CHARGE FOR SPEEDS UP TO & INCLUDING 9600 BPS	\$ 94.79 (2 WIRE)
ONE-TIME CHARGE FOR SPEEDS UP TO & INCLUDING 9600 BPS	189.57 (4 WIRE)
ONE-TIME CHARGE FOR SPEEDS UP TO & INCLUDING 48,000 BPS	(QUOTE)
● MONTHLY CHARGE FOR 50-9600 BPS	18.96 (2 WIRE)
MONTHLY CHARGE FOR 50-9600 BPS	37.91 (4 WIRE)
MONTHLY CHARGE FOR UP TO 48,000 BPS	189.57 (4 WIRE)

MONTHLY COST (\$) PER 100 METRES	SPEED		
	50 BPS	200 BPS	1200 BPS
● UP TO AND INCLUDING 10 KM	1.33	1.33	1.33
● > 10 KM < 50 KM	0.46	0.80	1.33
● > 50 KM < 100 KM	0.13	0.23	0.40
● > 100 KM	0.06	0.11	0.13

SOURCE: BUNDESPOST
JANUARY 1978

EXHIBIT III-9 (CONTD)

WEST GERMAN COMMUNICATIONS COSTS - LEASED LINES

MONTHLY COSTS (\$) PER 100 METRES	SPEED		
	2400 BPS	4800 BPS	9600 BPS
● UP TO AND INCLUDING 50 KM	1.52	1.90	2.37
● > 50 KM ≤ 100 KM	0.45	0.57	0.71
● > 100 KM	0.15	0.19	0.24

MONTHLY COSTS (\$) PER 100 METRES	SPEED
	48,000 BPS
● UP TO AND INCLUDING 30 KM	12.32
● > 30 KM ≤ 100 KM	7.39
● > 100 KM	2.16
MINIMUM CHARGE OF 100 METRES	

SOURCE: BUNDESPOST
JANUARY 1978

EXHIBIT III-10

WEST GERMAN COMMUNICATIONS COSTS - OTHER

CONNECTION CHARGES (PER CIRCUIT)	\$ COST
*ONE-TIME	\$ 94.73
● LOCAL CONNECT	18.96
● CENTRAL PTT CONNECT	4.74
*MONTHLY	
● BASIC CHARGE PER PTT CONNECT	15.17
● 2400 BAUD MODEM	151.66
● 1200 BAUD MODEM	101.66
● 200 BAUD MODEM	73.46
● AUTOMATIC DC SWITCHING	100.95

PSN LINE COSTS BY DISTANCE	\$/HR: DIALED DIRECT ACCORDING TO TIME DAY		
	06.00 - 18.00	18.00 - 22.00	22.00 - 06.00
● LOCAL (VARYING RADIUS)	4.36	4.36	4.36
● UP TO AND INCLUDING 25KM	8.72	5.81	5.81
● > 25KM TO ≤ 50KM	13.08	8.72	5.81
● > 50KM TO ≤100KM	26.16	17.44	5.81
● 100KM	32.70	21.80	5.81

NOTE: PSN = PUBLIC SWITCHED NETWORK

SOURCE: BUNDESPOST
JANUARY 1978

- Prices for services of all categories in Germany are on a par with Sweden's - the highest in Europe. This situation creates opportunities for RCS where the processing centers are based in a cheaper country. (The IBM supercenter in the U.K., destined to service the whole of Europe, is an example.)
- If a remote batch marketing plan could be found that took advantage of the huge installed base of small computers (offering financial consolidation services to decentralized establishments), this could provide significant potential.

C. FRANCE

I. OVERVIEW

- France is the largest European computer services market, but in contrast to the distributed nature of its competitor, Germany, 75% of all business done on the French market is done in the greater Paris area (Paris and its "banlieue"). This has led to the development of a group of very large computer services companies (in European terms).
- With nearly 700 vendors in the market, competition is very keen. But more importantly, the French market is influenced by the "old boys" network in effect, whereby who you know in business circles is almost as important as what you know about the business in question. This is particularly true of the banking, government, and para-public sectors.
- Thus, the two largest computer services vendors in France, CISI/SIA, which is 100% owned by CEA (Government Atomic Energy Commission) and CAP/GEMINI/SOGETI (the largest European software company, owned 34% by CISI/SIA) swear they are competitors and operate at arm's length, while simultaneously holding regular joint planning meetings.

- This combination of government (CEA), batch, remote batch, and interactive services (from CISI/SIA), and professional services and software products (from CAP/GEMINI/SOGETI), has been extremely effective. They jointly captured revenues equivalent to 23% of the French market in 1977 (22% of this revenue came from foreign markets, however).
- Excluding the equipment manufacturers who offer services, nearly 60% by number of the vendors in France are limited companies (Societes Anonymes) with a further 28% established as limited partnerships (Societes a responsabilite limitee).
- The French market is characterized by strength in two major submarkets: RCS and software products (SP). The latter has rapidly developed into the largest software products country market in Europe, with Paris headquartering many foreign (and U.S.) software products vendors.

2. COMPETITION

- The French RCS market was worth \$173 million in 1977, of which \$125 million was in remote batch services. IBM had an estimated 17% of this market, slightly ahead of CISI/SIA. The latter does 70% of its business with public sector clients such as the CEA, EDF (Electricity Co) and BNP (Banque Nationale de Paris, i.e., national bank).
- The same two companies had almost equivalent interactive revenues but were in contention for only fourth place in the interactive market. HIS-NIS has easily the largest share of interactive revenues (24%), followed by Cegi-Tymshare (13%) and SLIGOS (7%).
- GSI's revenue is the consolidation of all of its holdings in DATEL (Germany), CRC (UK), and GSI-Europe (which includes GSI-Switzerland, mainly composed of the former SISCO operations and EAD, an Italian subsidiary). The analysis of remote batch revenue is, therefore, misleading at the holding company level, and merely serves to indicate the size of the GSI operations, not its French market share (or competitiveness in that market).

- HB-NIS, in France, has a policy of pursuing only large/very large companies, much of which is "fall-out" from their large 66 series system equipment marketing/sales activities.
- G-CAM does 75% of its business with Caisse de Depots, of which it is a subsidiary. The main operational entities are Artemis, Sinorg, and IMI. Sinorg aims almost exclusively at the African and Middle East markets. In summary, G-CAM, despite its size, cannot be counted as serious competition on the open market.
- Cegi-Tymshare is owned 51% by Credit Lyonnais and first became profitable in 1974. Since then its presence on the interactive market has grown considerably and it is now the undisputed second largest interactive vendor in France.
- Among the remainder, SLIGOS (already analyzed) and CDC are the most important open-market competitors. Telesystemes is for all practical purposes a PTT subsidiary, and offers interactive, remote batch, and what is almost a value added network: "Transplex." CCMC is largely batch-oriented but is expanding its remote batch operations. It serviced over 30,000 clients in 1976 for accounting applications brought in by its CPA owners.
- Finally, NATEL, a 90% owned subsidiary of BNP, is the result of adding Honeywell Bull services (20 computer centers) to a group of data entry centers (Saisinfor, Perinfor) and Natio-Services (created in September 1971). In 1973, five other groups were added (CAM, CELORAM, CERTI, SPINATIC, and STAMIC). The result was chaos. To add to the confusion, the Philips data centers were added in 1974. The conglomerate thus achieved has taken three years to reorganize and is still not profitable.
- The principal vendors and their ranking by sales is given in Exhibit III-11 and III-12.

EXHIBIT III-II

THE TOP TEN REMOTE COMPUTING SERVICES VENDORS IN FRANCE, 1977

RCS RANK	COMPANY	RCS SERVICES (\$MILLION)			ALL SERVICES TOTAL (\$M)**
		REMOTE BATCH	INTERACTIVE	TOTAL	
1	IBM	\$14.0*	\$ 6.0*	\$20.0	\$23.0*
2	CISI/SIA	18.0*	2.5*	20.5*	70.7
3	GSI	18.1*	1.0*	19.1*	65.0*
4	HB-NIS	+	11.5*	11.5*	11.5*
5	CEGI-TYM-SHARE	0.5*	7.5	8.0*	8.0*
6	SLIGOS	21.0	3.3	24.3	45.0*
7	CCMC	5.3	-	5.3	33.6
8	G-CAM	5.2*	+	5.2*	30.6
9	NATEL	5.2*	-	5.2*	31.4
10	TELESYSTEMES	4.2*	0.9*	5.1*	28.4

SOURCE: INPUT CAMP/EUROPE

* = INPUT ESTIMATE

+ = SMALL VALUE

**\$M = \$MILLION

EXHIBIT III-12
RCS MARKET SHARES OF FRENCH FIRMS

RCS RANK	COMPANY	INDICATIVE MARKET SHARES (%)		
		INTERACTIVE	REMOTE BATCH	TOTAL RCS
1	IBM	18%	15%	16%
2	CISI/SIA	8%	20	17
3	GSI	3%	20	15
4	HB-NIS	35	-	9
5	CEGI-TYMSHARE	23	-	6
6	SLIGOS	10	23	20
7	CCMC	-	6	4
8	G-CAM		6	4
9	NATEL	-	6	4
10	TELESYSTEMES	3	5	4

3. MARKET SHARES

- The remote batch and interactive shares are described below for those companies that have significant impact on the open market, as shown in Exhibit III-13.
- The values listed for CISI/SIA and GSI are only an indication of activity, not true market shares, which would entail the elimination, by service category, of all foreign revenues.
- The values for all other companies are valid market shares based on INPUT estimates.

4. COMMUNICATIONS

- French PSN line costs are quite competitive and compare favorably with the European average, as shown in Exhibits III-14 and III-15. The quality of the lines does not compare well, however, nor does the average delay in obtaining lines (although this has vastly improved, halving in the last two years to today's average of ten weeks).
- PSN connection costs are very high at the short distance end and also entail a monthly rental. As the distance grows to 150km or more, the charge becomes more comparable to other major European countries.
- Leased lines are the most expensive in Europe and by such a margin that one wonders how they can be justified in the eyes of the PTT, let alone the users.
- When the same company uses both ends of the leased line (i.e., when the leased line is used for intercompany or intrasubsidiary communications) a 20% reduction is applied. The formulae used is directly dependent on straight line distance, such that there is a continuous variation of tariff between the tariff zones (kilometers 1, 2, 10, 20, 30, 50, 100, 200, 250, 300 and 311).

EXHIBIT III-13

MAIN FRENCH VENDOR COMPANY STRUCTURES

VENDORS	COMPANY SHAREHOLDINGS	COMPANY SUBSIDIARIES
CAP/GEMINI/SOGETI	KAMPF (51%) CISI (34%) OTHER SOGETI	CAP SOGETI LOGICIEL, SYSTEMES, PRODUITS, FORMATION EURINFOR, SORINFOR, SESI, CAP EUROPE, CAP UK, GEMINI, CES CREDINTOR
CCMC	ACCOUNTANTS (58.5%) SOCIETE GENERALE (39.5%)	
CEGI-TYMSHARE	CREDIT LYONNAIS (51%) TYMSHARE (45%) OTHER (4%)	
CERCI	EMPAIN SCHNEIDER (29%) CFUE (26%) MULLER & CIE (23%)	
CISI	CEA	INFOR, SIA LTD SOGETI (34%) EURINFOR
G.CAM-CAM	CAISSE DES DEPOTS (99%)	ARTEMIS (47%), SINORG, IMI
GFI	BANQUE NSM	SERTI, SOMAVI
GSI	CIE GLE D'ELECTRICITE (52%) SOCIETE GENERALE (24%) CCF (24%)	GSI.E.CFRO, CATI, CEG, CS INFORMATIQUE, 31, TECSI-SOFTWARE DATEL
NATEL	BNP (90%)	STERIA, NSI, NTI, STAMIC, SPINATIC, CELORAM, CERTI
SAMM	THOMSON-BRANDT THOMSON-CSF	SAMM SA, ANSWARE, ANSWARE CONSEIL, CICERO, CIG, PERFAC, SICOS, SEFI, TD, ASAM
SEMMA	BANQUE DE PARIS ET DES PAYS-BAS	SOFRES, PAM, TRILES
SLIGOS	CREDIT LYONNAIS (80%) TYMSHARE (20%)	SLIGOS RHONE-ALPES CENTRINFORMATIQUE, SATI, CEDO SLIGOS, AXYS, IN, SLIGOS INFORMATION SYSTEMS, SLIGOS GNBH, SLIGOS BENELUX

EXHIBIT III-14
FRENCH COMMUNICATIONS COSTS - LEASED LINES

LEASED LINE INDICATIVE TARIFF (\$ MONTHLY RENTAL)			
DISTANCE (KM)	2 WIRE	4 WIRE ON	4 WIRE QS
1	\$ 35.86	\$ 71.52	\$ 78.69
2	43.25	86.50	95.15
10	102.74	205.49	226.16
20	164.77	329.54	362.66
30	226.79	453.59	498.95
50	350.84	577.64	647.89
100	572.36	799.16	913.71
150	793.88	1,020.68	1,179.54
200	1,015.40	1,242.19	1,445.36
250	1,236.92	1,685.23	1,977.00
311	1,506.33	1,733.12	2,034.39
311	SAME TARIFF AS FOR 311 KM		

SOURCE: MINISTÈRE DES PTT FRANCE

EXHIBIT III-15
FRENCH COMMUNICATIONS COSTS - OTHER

PSN CONNECTION COSTS	\$ COST
● ONE-TIME	\$ 147.68
● MONTHLY RENTAL	FROM \$6.65 TO \$8.86 ACCORDING TO CITY/TOWN CATEGORY

PSN LINE COSTS DISTANCE	\$/HR: DIALED DIRECT	
	NORMAL RATE (8.00-20.00)	CHEAP RATE (20.00-8.00)
● LOCAL (VARYING RADIUS)	\$ 0.09	\$ 0.09
- UP TO 25 KM	4.43	2.22
- UP TO 50 KM	7.69	3.85
- UP TO 100 KM	13.23	6.62
- UP TO 200 KM	21.27	10.64
- GREATER THAN 200 KM	26.58	13.29

- At the top end (311km) the French tariff is approximately four times as expensive as the German tariff. Fortunately, most RCS business is done in and around Paris; where communications are necessary between Paris and Marseille there are alternatives, the most important of which is Transplex.
- Transplex (from Telesystemes) is practically a value added network which offers a data highway between Paris and Marseille with network collection points in all of the major cities in the North, West, Southwest, and South. The tariff is some 25-30% cheaper for equivalent or better services than those of the PTT. Yet Telesystemes is owned by France Cables, which is owned by the PTT.

5. CONCLUSION

- France is the prime RCS market in Europe and as such merits attention despite the difficulties facing a U.S. entrant. Establishing a Paris headquarters is no easy task. Buying into the market via the acquisition of an established French company is far more effective.
- The French like to deal at the highest levels (President, Vice President) of an organization, and with Frenchmen. Better still, if these same people are personal friends, the business opportunities are far greater. One step down from this is the "school tie" syndrome where alumni of say, l'Ecole Polytechnique or HEC, etc., even though perfect strangers, will prefer to deal with each other rather than with someone from another school.
- In this environment, establishing a Paris office staffed by foreigners is commercial suicide. An optional approach is that taken by McAUTO, Tymshare, and others who jointly funded, with an established well-known French company of similar nature to themselves, the development of existing operations.

- French nationals are nearly as insular as their U.K. counterparts. (The foreign language ability of the average Frenchman usually limits him to France and Belgium.)
- RCS competition is very strong in France, but the market is expanding rapidly enough to accommodate further vendors, particularly in financial applications, for which there is an increasing demand.

D. SWEDEN

I. OVERVIEW

- Just over 80 vendors supply computer services to the Swedish market, which in 1977 was worth \$268 million. Of this, \$58 million was produced by RCS.
- The Swedish market is characterized by high end-user prices and high staff and accommodation costs. On average, Swedish companies have a high percentage of staff dedicated to administration and low percentage of staff in sales/marketing. Turnover per employee tends to be lower in Sweden than in the other countries analyzed.
- Sweden's largest market is batch services, which absorbs 52% of the total computer services market, more than the 46% average across Western Europe.

2. COMPETITION

- SPADAB, DAFA, DATEMA, and BONNIERDATA provide a strong domestic challenge to the foreign suppliers (IBM, Honeywell, and CDC). IBM is neither the largest overall supplier nor the prime supplier for either remote batch or timesharing.

- SPADAB is owned by a consortium of Swedish savings banks and does a significant (55%) part of its business "internally" for these banks. SPADAB is also very active on the open market for financial applications, however.
- DAFA is state-owned and absorbs a considerable volume of local and central government business. Nearly 60 different local government clients make use of its services. This does not stop DAFA from achieving 35% of its revenue from the open market at prices that defy competition (much to the disgust of private competitors who feel that their taxes are being used to subsidize DAFA).
- DATEMA began as the EDP department of the Axel Johnson group, and then began providing services to the open market in 1968. The RCS activities were strengthened by the acquisition of ITT Data Services.

3. MARKET SHARES

- The remote batch market is very evenly divided between the top four companies, but considering their different market emphasis, none of the four really provide competition for the others.
- This is not the case in the interactive market, where Honeywell is easily ahead of all other vendors but is in direct competition with all of them for practically the same market - interactive financial services. Market positions of the leading RCS vendors are shown in Exhibits III-16 and III-17.

4. COMMUNICATIONS

- Sweden's P.T.T. line costs are moderate, particularly in view of the high end-user prices and staff costs. Sweden is unique in Europe in that there is an independent supplier of communications lines and modems (Televerket), which has not only helped to keep the line costs down, but has also accelerated the speed of market penetration. As a result, the penetration rate (numbers of telephones per head of population) is comparable to that of the U.S. (70%).

EXHIBIT III-16
RCS MARKET SHARES OF SWEDISH FIRMS

RCS RANK	COMPANY	INDICATIVE MARKET SHARES (%)		
		INTERACTIVE	REMOTE BATCH	RCS TOTAL
1	SPADAB	-%	11%	9%
2	DAFA	-	10	8
3	IBM	5	9	8
4	DATEMA	4	7	6
5	HB-NIS	27	-	5
6	CDC	2	4	4
7	KOMMUN-DATA	-	5	4
8	BONNIERDATA	5	3	4

EXHIBIT III-17
MAIN RCS COMPETITORS IN SWEDEN

RCS RANK	COMPANY	RCS SERVICES (\$MILLION)			ALL SERVICES (\$M)**
		REMOTE BATCH	INTERACTIVE	TOTAL	
1	SPADAB	\$4.5*	\$ -	\$4.5*	\$32.3
2	DAFA	4.3*	-	4.3*	12.9
3	IBM	3.7*	0.4*	4.1*	16.0*
4	DATEMA	2.8*	0.3*	3.1*	34.3
5	HB-NIS	-	2.3*	2.3*	2.3*
6	CDC	1.9*	0.2*	2.1*	2.4*
7	KOMMUN-DATA	2.0*	-	2.0*	11.5
8	BONNIERDATA	1.4*	0.4*	1.8*	4.1*

* = INPUT ESTIMATE

**\$M = \$MILLION

5. CONCLUSION

- The Swedish market is an attractive one, but extremely difficult to penetrate. Established vendors already provide a broad array of services and are aggressive competitors.
- The existence of heavily financed, strong RCS suppliers like SPADAB, DATEMA, and DAFA in the remote batch market preclude the overnight creation of a foreign source of services.
- Sweden is a viable center for operations aimed at the Scandinavian market (Finland, Norway, Denmark, and Sweden), being situated in the geographical center of that market and armed with excellent quality (and reasonable priced) telecommunications.
- This approach has already been adopted by a number of computer services vendors in the Scandinavian market with good success.
- The Swedes are frequently multi-lingual, particularly with regard to the Scandinavian market, and consider the English language a second tongue. (There are several Swedish newspapers that provide English language editions.)

E. BELGIUM

I. OVERVIEW

- Out of a total vendor population of 74 computer services companies in Belgium, there are 20 that supply RCS, 13 of which provide interactive services. All are small, with the exception of IBM and CIG/GTS, (which markets GE's Mark III in Belgium and which, as a result, has the largest share of the interactive market).

- CDC, having chosen Brussels as its European computer services headquarters, (unlike IBM and GE/HIS, both of which are in Paris), has also located its supercenter at the Brussels airport. To date, however, the center remains half empty, reflecting an expansion most likely behind schedule.
- Foreign-owned companies have a strong influence on the RCS markets: UCC (U.S.), IBM (U.S.), CDC (U.S.), Burroughs (who operate a batch/remote batch bureau), CSC (U.S.), Cyphernetics (U.S.), COMSHARE (U.K./Canada), CEGOS-Tymshare (France), SIA-B (France).
- Internation operations, therefore, generate a high percentage of revenues (75%), particularly since the domestic suppliers, with the exception of CIG/GTS, are mainly small and privately held.
- International operations excepted, the domestic market is firmly entrenched in traditional, off-line data-entry/batch services (data preparation is a relatively good market in Belgium). Turnkey minicomputers are doing well, however, and there is some evidence that on-site hardware linked to networks would be attractive.
- The total RCS market was worth a small \$36.9 million in 1977. As such, while personal tax laws have attracted good quality people into the Brussels area (making it an attractive location for an RCS base of operations), the domestic market is not worth competing for. There are too many suppliers competing for too few dollars.

2. COMPETITION

- All major competitors are concentrated in Brussels, where 72% (53 out of the 74 vendors) have located their main offices. This is the only local market worthy of consideration (although national suppliers do have far wider coverage, of course); ORDA-B, for example, has offices in Bierbeek, Kortrijk, Antwerpen, and Maasmechelen in addition to its two offices in Brussels.

- The main competition for the interactive market is between IBM (whose presence is strongly felt in the small Belgium market for interactive and remote batch services) and GE's marketing representative, CIG/GTS. A challenge is slowly being mounted by COMSHARE based on highly price/competitive on-line services, but its revenues are, as yet, very small.
- The top ten vendors shown in exhibit III-18 cover 95.2% of the interactive market in Belgium. Others not shown include I.P. Sharp, Continental Computing, CEPOC, Sobemap, Mandata, and the University of Louvain.
- In the remote batch market, IBM leads with ORDA-B second. Along with UCC, these three absorb nearly half of the remote batch revenues in Belgium.
- A recent survey indicated that most of the batch and remote batch vendors were concerned with the rate of success of the in-house, minicomputer-based small business system, which has grown in popularity. Many vendors are looking to forestall the impact these systems could have on their revenues by entering into OEM agreements with manufacturers.
- The main RCS vendors in Belgium are listed in Exhibit III-18.

3. MARKET SHARES

- Two-thirds of the Belgium RCS market is divided between six vendors, as shown in Exhibit III-19.
- The small size of the total market makes even modest revenue appear as a significant share of the market. Nevertheless, the remote batch market is mostly divided between four vendors (IBM, ORDA-B, UCC, and CDC), while the interactive market is principally divided between only two, IBM and Honeywell (CIG/GTS).

EXHIBIT III-18

THE TOP TEN REMOTE COMPUTING SERVICES VENDORS IN BELGIUM, 1977

RCS RANK	COMPANY	RCS SERVICES (\$MILLION)			ALL SERVICES TOTAL (\$M) **
		REMOTE BATCH	INTERACTIVE	TOTAL	
1	IBM	\$3.3*	\$3.7*	\$7.0*	\$ 7.5
2	CIG/GTS	2.4*	3.4*	5.8*	16.9
3	CDC	1.8*	1.8*	3.6	3.7
4=	ORDA-B	1.8	-	1.8	4.3
4=	UCC	1.8*	+	1.8*	3.5*
6	ADP/CYPHER NETICS	-	0.9*	0.9*	0.9*
7=	SIA-B	0.6*	+	0.6*	0.6*
7=	CEGOS-TYM SHARE	+	0.6*	0.6*	0.6*
9	CSC	+	0.3*	0.3*	0.3*
10	COMSHARE	+	0.25	0.25	0.25

SOURCE: INSEA, INPUT
CAMP/EUROPE

* = INPUT ESTIMATE

+ = SMALL VALUE

**\$M = \$MILLION

EXHIBIT III-19
RCS MARKET SHARES OF BELGIAN FIRMS

RCS RANK	COMPANY	SHARE OF RCS MARKET (%)		
		INTERACTIVE	REMOTE BATCH	TOTAL RCS
1	IBM	16%*	20%*	19%
2	ORDA-B	+	15*	12
3	UCC	+	12*	9
4	CDC	4*	9*	8
5	CIG/GTS	33	+	8
6	CEPOC	11	6	7

SOURCE: INPUT CAMP/EUROPE

* = INPUT ESTIMATE

+ = SMALL VALUE

4. CONCLUSION

- The Belgium market, in itself, certainly does not offer adequate motivation for locating offices in Brussels. The main attraction is the high number of international companies who have their headquarters in the city and who can be used as the leverage point for important international contacts.
- Brussels is also strategically placed with respect to the Netherlands, Paris (the largest slice of the French market), the Ruhr-Gebiet (the largest share of the German market), and is within striking distance of Copenhagen, London, Stockholm and Oslo.
- Modern office accommodations and well-educated EDP staff are available in Brussels to an extent not easily duplicated elsewhere. The "basic materials" for the creation of a high quality European operation are, therefore, available.
- The national company tax laws are not overly restrictive on the movement of capital. This enables flexible financial transactions and profit repatriation from subsidiaries.
- Belgium nationals are frequently bi-lingual and sometimes tri-lingual. Flemish is equivalent to Dutch and is easily understood by the latter and, to some extent, by the Germans. French, the other Belgium national language, provides the link with France, of course.

F. NETHERLANDS

I. OVERVIEW

- Five aspects, all of them positive, make the Netherlands an attractive market for the RCS vendor: profits from holding companies established there can be transferred out of the country without local taxes being applied; the Dutch are

bi- tri- or quadri-lingual, dependable and uncomplicated; communications costs are very low and of good quality; road and air traffic are fluid; the Netherlands are centrally situated with respect to all of the other Western European countries.

- Over 75 suppliers shared the \$223 million produced by computer services in the Netherlands in 1977. Nearly 20% of these were divisions of corporations.
- Despite its relatively small size, the Dutch RCS market is showing strength with significant growth in 1977 for interactive services (25%) and in remote batch (12%).
- The number of RCS vendors continues to grow with new entrants entering an already congested market. CEGOS-Tymshare is the most recent. This vendor pressure is one of other major factors in the market's growth.
- The majority of clients lie around and in the area between Amsterdam, the Hague, and Rotterdam, including the cities of Utrecht and Hilversum. Companies in those cities have a contiguous area of 50km that encompasses 75% of the Dutch prospects.
- The sales by region in 1977 was as follows:
 - Den Haag (The Hague) 30%
 - Amsterdam 30%
 - Rotterdam 25%
 - all other 15%

The investment policy of the Dutch Government is encouraging faster growth in the "other" areas, but the above distribution will not change dramatically in the next five years.

2. COMPETITION

- Ten companies share 57.7% of the Dutch RCS market, as shown in Exhibit III-20. The same group absorbed 44.2% of the remote batch market and 92% of the interactive market.
- Most of the international RCS companies are present. There are some notable exceptions however: CSS International (NCSS), and Rapidata.
- Others who are present, but with small interactive revenues are: Infotech, Logisterion, Computer Centrum Groningen, Ing.D.V., Datastream, I.P. Sharp, Atkins On-Line, and CSS.
- IBM has a small share of the remote batch market (12%), closely followed by CDC, CCN (Computer Centrum Netherlands), ACD (Alpha Computer Diensten) and ARC. However, IBM is easily the largest RCS supplier in the Netherlands due to its combined strength in interactive and remote batch services.
- GE/Honeywell (HB-NIS) is, as usual, the leading supplier of interactive services but with a higher market share than usual (34%). The nearest competitors are IBM with 25% and ADP/Cyphernetics which took 12%.

3. COMMUNICATIONS

- The Netherlands offers the cheapest line costs in Europe and excellent quality. Despite this, RCS has not developed any more rapidly than the French market.
- Leased line costs are one tenth of those of France and public switched network lines are also far cheaper.
- Connection costs are equivalent to those of the U.K.

EXHIBIT III-20

THE TOP TEN REMOTE COMPUTING SERVICES VENDORS IN THE NETHERLANDS, 1977

RCS RANK	COMPANY	RCS SERVICES (\$MILLION)			ALL SERVICES TOTAL (\$M)**
		REMOTE BATCH	INTERACTIVE	TOTAL	
1	IBM	\$4.6*	\$3.8*	\$8.4*	\$ 9.0*
2	HB-NIS/GE	+	5.1*	5.1*	5.1*
3	CDC	3.4	1.3	4.7	5.0
4	CCN (1)	3.3	0.1	3.4	12.0
5	ACD (2)	2.2	0.6	2.8	8.7
6	ARC	2.4	-	2.4	2.4
7	RAET	2.0	+	2.0	9.9
8	ADP/CYPHER NETICS	+	1.8*	1.8*	1.8*
9	UCC	0.9	0.2	1.1	1.1
10	COMSHARE	-	0.9*	0.9*	0.9*

SOURCE: INPUT/CAMP AND SPECIFIC RESEARCH
ON HOLLAND MARKET ENTRY

(1) - COMPUTER CENTRUM NETHERLANDS

(2) - ALPHA COMPUTER DIENSTEN

* = INPUT ESTIMATE

** \$M = \$MILLION

+ = SMALL VALUE

4. CONCLUSION

- As with Belgium, barring acquisition, the Dutch market is too small to allow new entrants a reasonable chance of success. All of the major prospects have been identified long ago and are regularly visited by the existing RCS vendors.
- For tax return reasons, for the flexibility offered by Dutch staff (who frequently speak four languages - English, French, German, and Dutch - which is also understood by the Flemish part of Belgium) and for the tax rules applying to the movement of capital into and out of the country, the Netherlands can be a useful base of European operations, once they have grown to international proportions. As such, a holding company in Holland makes sense, even if straight market entry does not.
- The very low cost of telecommunications and the central location of the Netherlands with respect to large regions such as the Ruhr-Gebiet (Germany) has encouraged General Electric to locate its supercenter in the Netherlands. A circle of 400 miles around Amsterdam covers all of West Germany, most of England and Scotland, Berne, Paris, Belgium, and Luxembourg.

G. ITALY

I. OVERVIEW

- In 1977, the Italian market was \$370 million, the fourth largest market in Europe. This value does not include captive revenues. Over 1,150 computer services companies were identified in the CAMP/Italy research, half of which have less than ten employees. Total employment is around 18,000.
- The Italian banks have a dual role in Italy's services industry: (a) they own several large services vendors and, through them, control 15% of the available Italian market; (b) bank computer centers, companies or consortiums

(small/medium sized banks mainly) provide an important part of the computer services for the banking community. The vendors themselves are nearly all (71.5%) located in the North of Italy, particularly in Lombardy (35.5%), Piedmont (12.4%), and Veneto (9.5%). Only 10.2% of the vendors population is in or around Rome.

- A clear picture of the Italian market emerges from an analysis of the vendor population in terms of sales and employees as shown in Exhibit III-21.

2. COMPETITION

- The Italian RCS market was only 11% of the total of \$370 million in 1977 - nearly two and one half times smaller than the proportion found in other countries.
- Only eight RCS vendors are large enough to mention and are listed in Exhibit III-22.
- IBM has made an important effort towards improving the RCS service and has narrowed the gap with HIS in interactive services.
- DATAMONT provides 90% of its services to the Montedison group and only 10% to other commercial entities.
- ADP-Cyphernetics is now one of the main interactive services vendors active in Italy, with offices in Milan and Rome, and is on a par with DATAMONT. ADP is in fact number three for interactive in terms of the available (i.e., non-captive) market.
- Other interactive vendors include INFONET, SIPE OPTIMATION, DATA AUTOMATION, and SICIT. Other remote batch vendors include AUSELDA and ITALSPED in addition to the above.

EXHIBIT III-21

**VENDOR POPULATION BY SALES RANGE IN THE
ITALIAN MARKET**

1977 SALES RANGE (MILLION LIT)	%
≤ 200	49 %
> 201 TO 500	31
> 501 TO 1000	10
> 1000	10
	100 %

NUMBER OF EMPLOYEES	%
≤ 10	51.0 %
> 11 TO 25	30.6
> 26 TO 50	11.1
> 51 TO 100	3.9
> 100	3.4
	100.0 %

EXHIBIT III-22
REMOTE COMPUTING VENDORS IN ITALY, 1977

RCS RANK	COMPANY	RCS SERVICES (\$MILLION)		TOTAL	ALL SERVICES TOTAL (\$M)**
		REMOTE BATCH	INTER- ACTIVE		
1	IBM	\$7.9*	\$4.9*	\$12.8*	\$17.9*
2	HIS	+	5.2*	5.2*	5.2*
3	DATAMONT	4.9	1.2	6.1	21.0
4	CDC	3.7*	0.2	3.9*	3.9*
5	DATA MANAGEMENT	2.5	+	2.5	14.8
6	GE-DA	1.9	-	1.9	8.6
7	SEDA	1.7	+	1.7	8.6
8	ADP	-	1.2	1.2	1.2

SOURCE: CAMP/ITALY

* INPUT ESTIMATE

** \$M = \$MILLION

+ SMALL AMOUNT

- Growth for interactive is remarkably strong and estimated by the major vendors to be in the 25-30% range. A new interactive addition to the Italian market is INFONET (owned by GEDA). The Italian PTT (SIP) is gradually improving the network quality in the face of a continuous rise in demand.
- A listing of the fifteen largest vendors of all computer services and excluding manufacturers is shown in Exhibit III-23.

3. CONCLUSION

- Despite repeated difficulties of establishing a viable network of public switch lines, Italy has nevertheless developed an underlying demand for RCS services which is spread among very few vendors. As a result, each sees its market expanding rapidly.
- With the high concentration of business north of the Genoa/Bologna line, serving the larger part of the market is not too costly from any one of a dozen cities. The added attraction of the north is that the congestion of Rome (the administrative and political center) is avoided.
- Politically and socially, Italy continues to be unstable. The market is nevertheless the fourth largest in Western Europe - an attraction not to be overlooked.

EXHIBIT III-23

**THE FIFTEEN LARGEST ITALIAN
COMPUTER SERVICES VENDORS
(EXCLUDING MANUFACTURERS)**

RANK	COMPANY	1977 TOTAL REVENUES (\$M)**
1	ITALSIEL*	\$24.1
2	DATAMONT	21.0
3	DATA MANAGEMENT	14.8
4	S.G.I.*	14.2
5	SIPE OPTIMATION	13.0
6=	SE DA	8.6
6=	GE-DA	8.6
8	SYNTAX	6.3
9=	ITALSPED	4.3
9=	S.P.I.	4.3
11	INFORMATICA FRUILI VENEZIA GUILIA*	4.2
12=	C.E.R.	3.7
12=	C.D.S. ITALIA	3.7
14	DATAMAT	3.1
15	ITALSIEL IMPRESE*	2.6

* BELONG TO ITALSIEL GROUP

** \$M = \$MILLION

IV ENTERING EUROPEAN MARKETS

IV ENTERING EUROPEAN MARKETS

- The variety of approaches that are open to a foreign vendor entering Europe should not be regarded as just so many options. In reality, of course, there is only one ideal solution for a given situation.
- In addition to the legislative limitations that apply to certain types of services vendors (e.g., banks), there can be ownership-related restrictions on markets served (conflict of interest), nationality-related barriers and government refusals that can negate the achievement of otherwise attractive transactions.
- The pros and cons of the four main categories of options are examined below.

A. RESTRICTIONS, BARRIERS AND OPPORTUNITIES

- Each European computer services country market has a business/market profile that is unique and which places restrictions on the type of approach that can be adopted by suppliers but that also offers concrete opportunities to the discerning vendor.

- There is little point, for example, in attempting to serve the Dutch market from Dusseldorf, whatever the attractions of the logistics. The Germans and the Dutch don't mix well.
- In the same way it must be recognized that there are two business communities in Belgium, which are separated by much more than mere languages.
- These nationality-related limitations are far more serious, in a sense, than the "all or nothing" type of barriers that governments can impose. Whereas with the right approach and shrewd negotiations, the latter can be overcome, the former are unlikely to change in the foreseeable future, regardless of the resources deployed.
- It is galling for a U.S. vendor to be refused permission to acquire a French company on the ground of conflict with the "national interest." Perseverance will eventually win through, particularly if, for example, adequate pressure is brought to bear on authorities through the unions. However, most situations of this nature can be avoided if planned for.

B. BANKS ENTERING THE EUROPEAN RCS MARKET

- Limitations on the entry of bank-related organizations into the European RCS market are, as a rule, not based upon legislation but on "de facto" barriers imposed by the banking community or the computer services companies themselves (as in Denmark).
- When imposed by banks, these barriers usually consist of no more than obtaining formal approval from the central national bank that manages monetary policy (e.g., La Banque de France, for France, the Bank of England, the Deutsche Bundesbank, the Banco d'Italia, etc.).

- This can prove just as rigid as formal legal exclusion if approached in the wrong way, but can be circumvented in most cases through the creation of "arm's-length" subsidiaries. When imposed by the computer services community, however, the barrier is not so easily circumvented.
- In some countries (e.g., U.K., Belgium) approval is a formality since many precedents have already been established. In others, (e.g., France), despite the many banks active in the domestic computer services market, formal approval must nevertheless be sought (in this case from the Ministere des Finances).
- Bank-owned computer services companies earned in excess of a quarter of a billion dollars in 1976 in Western Europe. This value has grown regularly at between 22 and 26 per cent each year since 1971. Top bank owned computer services companies in Western Europe are listed in Exhibit IV-1.
- All Western European countries have bank-owned or bank-operated computer services companies offering standard batch and RCS processing services.
- The involvement of banks, both direct and indirect, in computer services companies in Western Europe is extensive. This involvement is particularly evident in France. All such companies offer RCS.
- Ownership ranges from partial participation to a 100% holding. The size of the company owned ranges from \$33 million to less than \$5 million. The involvement of the banks through these subsidiaries in the computer services industry extends to all service categories: software houses, system houses, batch bureaus, etc.
- The largest European bank-owned company is SLIGOS (France), 92% owned by Credit Lyonnais. This is in fact a group of ten limited companies. The chart of Credit Lyonnais holdings, as shown in Exhibit IV-2, gives a good idea of how tortuous European company control can be.

EXHIBIT IV-I
**TOP BANK-OWNED COMPUTER SERVICES
 COMPANIES IN WESTERN EUROPE**

RANK	VENDOR	COUNTRY	MAIN ACTIVITY	BANK OWNED BY/ OR PARTICIPATION	1977 REVENUE (\$M)**
1	SLIGOS	FRANCE	P/R/B	CREDIT LYONNAIS	\$40.1
2	SPADAB	SWEDEN	R/B	CONSORTIUM OF SAVINGS BANKS	32.3
3	G-CAM	FRANCE	R/B	CAISSE DE DEPOTS ET CONSIGNATIONS	30.6
4	CCMC	FRANCE	R/B	SOCIETE GENERALE	33.6
5	NATEL	FRANCE	P/R/B	B.N.P.	31.4
6	CIG/GTS	BELGIUM	P/R/B	SOCIETE GENERALE*	16.9
7	CENTREFILE	U.K.	R/B	NAT.WEST	15.9
8	BARIC	U.K.	R/B	BARCLAYS BANK	13.2
9	TIETOTEHDAS	FINLAND	P/R/B	VERENINGS BANK	9.8
10	DATA MANAGEMENT	ITALY	R/B	CREDITO ITALIANO	9.4
11	ALPHA COMPUTER DIENSTEN	NETHERL.	P/R/B	MIDDLESTAND	8.7
12	INTERDATA	SWITZERL.	P/R/B	HOLDER BANK FINANCIERE	7.6
13	TELEKURS	SWITZERL.	R/B	BANK CONSORTIUM	7.4
14	BIK	W.G.	P/R/B	COOPERATIVE CREDIT BANK	6.1
15	ALLDATA	W.G.	P/R/B	BANK CONSORTIUM	5.7
16	MULTIDATA	DENMARK	P/R/B	BANK CONSORTIUM	5.0

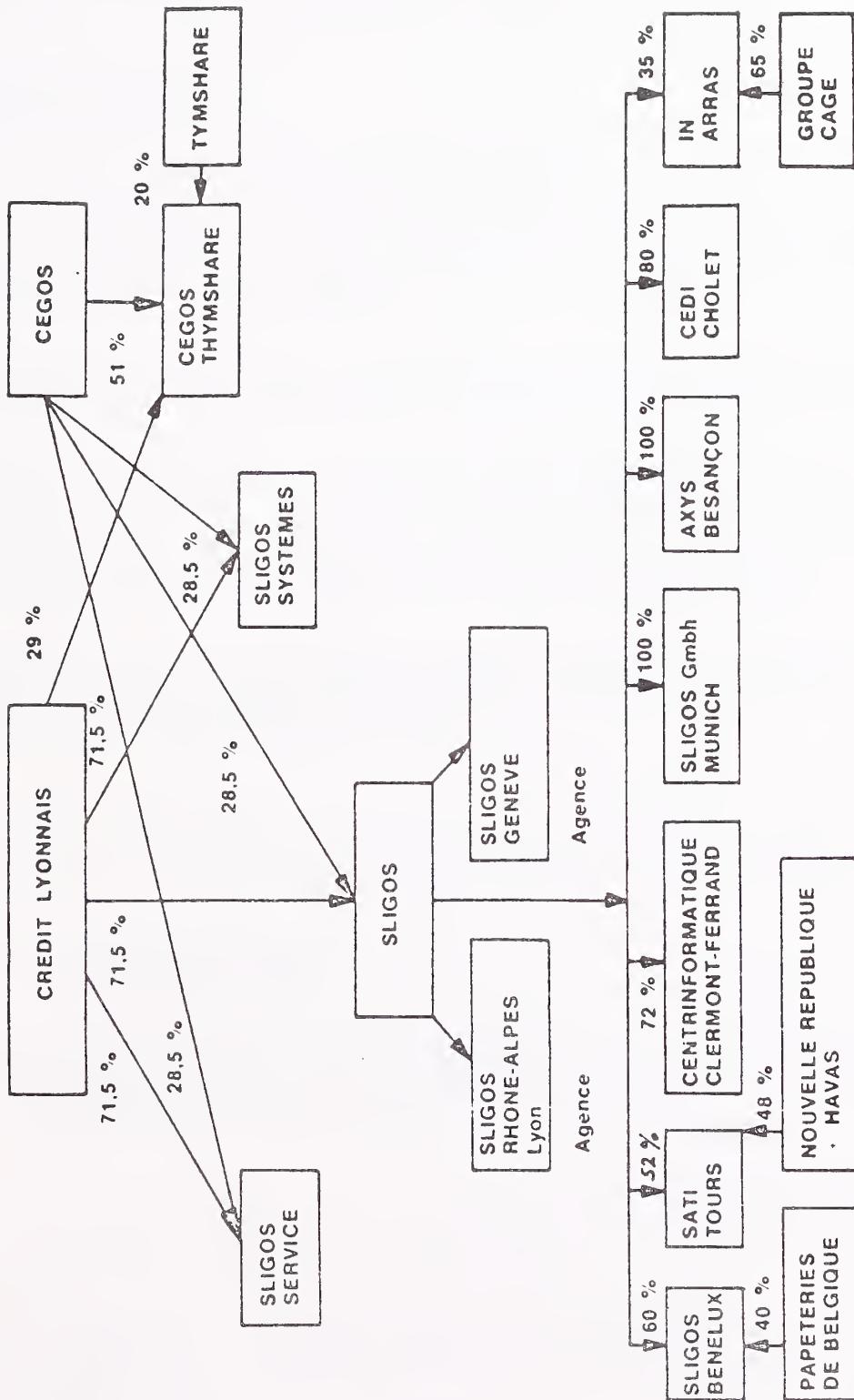
* NOTE THAT THIS IS NOT THE SAME SOCIETE GENERALE AS FOR CCMC

** \$M = \$MILLION

ACTIVITIES CODE: P = PROFESSIONAL SERVICES
 R = REMOTE COMPUTING SERVICES
 B = BATCH SERVICES

EXHIBIT IV-2

ORGANIZATION CHART DEPICTING
CREDIT LYONNAIS HOLDINGS



- A popular formula is that of joint holding, by a consortium of banks, in a computer services subsidiary which provides internal services to the banks and the external services to the open market. SPADAB (Sweden), Telekurs (Switzerland), BIK and Alldata (Germany), and Multidata (Denmark) are examples.
- France has the highest density of bank owned computer services vendors with seven major banks holding shares in one or more vendors:

-	BNP	NATEL	90% holding
-	Credit Lyonnais	SLIGOS	92% holding
-	Societe Generale	CCMC	39.4% holding
-	CCF	GSI	24% holding
-	Caisse de Depots and Consignations	G-CAM	99% holding
-	Banque NSM	GFI	99% holding
-	Banque de Paris and des Pays-Bas	SEMMA	100% holding
- Due to a strict interpretation of the Banking Act of 1973, there is strong opposition to bank-operated or bank-owned computer services groups in Denmark, even to those that have already managed to establish themselves. There is no chance of a foreign bank setting up computer services operations in Denmark.
- In addition to the legal barrier, opposition comes from the computer services companies themselves, organized around the computer services association, Foreningen Af Danske EDB Servicebureauer (FDE). This is based on the conviction that many financial services, if integrated into the operation of standard bank services, provide convenience and simplicity that cannot be duplicated by bureaus that are not allied with a bank.

- The pressure on existing services reached a point, two years ago, where Multidata sold off its accounting-package operations because, in the words of the managing director, "it wasn't worth the trouble it was causing us."

C. THE ACQUISITION ROUTE

- Most favored among the expansion routes into Europe, the acquisition approach has many obvious advantages:
 - No lengthy start-up, instant revenue volume, instant market presence.
 - Vehicle for distribution of existing parent-developed products and procedures (know how), and for instant market expansion through international reference selling of combined company strengths.
 - A working team of nationals (language); an established business site; registered, operating company entity.
 - Established client base (important not only for the services they currently buy but for the revenue base expansion they can provide).
- Less obvious are the disadvantages:
 - Lengthy decision time for the acquisition's completion (can be several years) - but developing from scratch can take ten years.
 - Dropping "unrelated" services from the new acquisition can give the parent a bad name (externally and internally).
 - Internal politics are inherited with the acquisition and are often deep-rooted.

- Degraded image following the acquisition (e.g., main center of decision displaced from local town to a foreign country).
- Foreign control adds a layer of management (career paths are lengthened for the acquired staff).
- New business methods are not understood, applied poorly or simply rejected.

- But despite the problems, the acquisition approach makes the most sense from business, timing and growth standpoints. In addition, it is often possible to achieve an industry-based synergy which results in expansion of the parent's own business scope, through the infusion of related or expanded services that are germane to, connected with, or complimentary to the industry(ies) already serviced by the parent. Examples are civil engineering, offshore oil exploration, scientific processing, network implementation, financial planning, systems data base services, and stock market quotation. All are transportable.

D. THE JOINT VENTURE

- While offering some attractive options in the short and medium term, the joint venture is rarely a long term strategy that offers unfettered growth. Inevitably, the time will come when the two (or more) partners' interests will conflict, resulting in internal stress or a limitation in expansion for one or several of the participants.
- In the early stages the attractions are many:
 - The combination of hitherto separate products and services can create a viable new market opportunity for both partners.

- In the European environment, the addition of American technology to a domestic operational entity comprising the necessary local contracts and understanding of the national market can prove a powerful combination.
- A truly synergistic venture is not too difficult to identify (e.g., hardware systems vendor with a local systems house having the appropriate industry specialization).
- Start-up funding (and consequently risk) is shared, i.e., lessened for both partners.
- There are practically no governmental/legislative restrictions on the creation of most joint ventures arrangements in Western Europe.
- Both (all) partners can persuade themselves they are getting the best deal, etc.

- But in the short term, simple problems can provide points of contention: how are the start-up costs spread? How are the early losses recouped (frequent source of acrimony)?
- Longer term problems can be worse. For example, if agreement allots a territory to a partner who reveals himself incapable of handling it, how does the other partner regain control without jeopardizing the parts of the agreement that are functioning well?
- For these and similar reasons, the best joint venture is one of finite duration, i.e., having a stated life, after which the option is provided to both partners of renegotiating the conditions, shares and scope of the original agreement. At the very least, it can defuse the on-going operational tensions during the current agreement, in that they will "not last for ever." In the best case it allows one or both partners to redefine the scope of his intentions and restructure his efforts accordingly.

E. THE SPIN-OFF OPTION

- The option presented here is basically that of identifying, for acquisition or joint venture, a large in-house computer services center that offers:
 - A large computer resource that is compatible with the processing service of the acquiring vendor.
 - Substantial in-house processing that is unlikely to be displaced by a change of ownership of the center.
 - A good opportunity for entering into good contact with the sector market in which the computer center's parent is active.
- The former are all short-term benefits. Longer term benefits can include:
 - Top-level contacts in major company groups (again through the parent of the spun-off computer center).
 - Availability of an on-going concern with an established client base.
 - An established staff team.
- The most crucial aspect of such takeovers is the ability of the acquirer to organize quickly an effective marketing effort to establish a client base. For obvious reasons marketing is unlikely to be strong in the in-house center and the number of clients is most likely to be limited.
- Ideally, a long-term contract of service to the spin-off's parent is an integral part of the agreement and in both parties' interests: the parent receives a guarantee of the continued availability of vital services; the acquirer obtains a guaranteed minimum revenue on which to build a commercially viable business.

- What can prompt a parent company to enter into such an arrangement? In most cases, the initiative must come from the acquirer, who needs to convince the parent that there is:
 - A natural fit of capabilities within the two companies ("we understand your business").
 - Compatibility of product and service between the two.
 - A commercial market for the combined product/services offering of the two companies.
 - Marketing know-how from the acquirer.
 - Real (monetary) gains to be had from the joint venture or acquisition.
- The main objective is to exploit the better perception of the market potential (by the acquirer) in exchange for a foothold in a foreign market and the backing of a well known domestic (if not international) parent company.

F. GOING IT ALONE

- Despite the many difficulties and often high start-up costs associated with starting from scratch in a foreign country, the long term benefits of this approach are frequently well worth the effort.
- Provided that timing is not crucial, large investments are not necessary and negative cash flow can be kept within \$200,000 for a small three man office. The vital keystone to operations of this nature is the individual chosen to head the new subsidiary.

- There is very little excuse/justification for not choosing a national for this important role, however tempting it may be for placing control in the hands of in-house staff. Each European country market environment is a matrix of very particular laws, regulations, customs and habits that take years for an outsider to grasp. It is far better to buy this knowledge in the shape of a seasoned professional who has a successful track record with the competition or related services markets.
- When all is said and done, finding space, recruiting staff, doing battle with the local PTT, establishing an image, etc., can be far less fearsome than dealing with internal politics inherited from a merger or legal battles over territory from a joint venture and similar hidden effects of otherwise attractive operations.
- The final choice will be made by balancing the related factors of revenue targets, product mix, country chosen, internal/external personnel resources, financial aspects and the like. A basic fact is that market opportunities exist in Europe for new entries, and alert companies will capitalize on them.

V MAJOR RCS VENDORS IN EUROPE

V MAJOR RCS VENDORS IN EUROPE

- The following analysis highlights the European operations of the main RCS vendors, leaving aside those vendors that are only active in their domestic markets.
- The analysis is divided into three sections:
 - An overview of the RCS activities of the three main equipment manufacturers (IBM, HIS, and CDC).
 - Detailed profiles of the main established international services companies (UCC, COMSHARE, ADP).
 - An overview of companies that are in the process of establishing themselves (CISI/SIA, National CSS, Tymshare, Atkins On-Line, and GSI/CRC).
- Companies active mainly in their own domestic markets are dealt with in the respective country market descriptions.

- While every effort has been made to be as precise and as accurate as possible, the natural reluctance of vendors to disclose financial data and strategic information, plus the rapid changes that constantly occur in the services industry, create a moving environment that is difficult to grasp. The data that follows may, therefore, require immediate updating.

A. THE EQUIPMENT MANUFACTURERS

- A full analysis of the three major equipment manufacturers offering computer services in Europe is beyond the scope of this report, since each vendor merits a report of its own. Their estimated 1977 revenues, however, are presented in Exhibit V-1.
- Nevertheless, an overview of INPUT's estimates of the sales achieved by each of them in the major country market is a useful guideline to the level of competition that can be expected from these large vendors.
- IBM is the only one of the three that provides an equal measure of competition in both the interactive and remote batch markets. The largest IBM RCS market is France followed by the U.K. and West Germany.
- Honeywell is predominantly an interactive vendor with negligible activity in remote batch service, except where an agency has the marketing/distribution rights to the MARK III service (see Belgium). Honeywell easily is the largest interactive services vendor in Europe.
- CDC in contrast is almost entirely batch and remote batch oriented, with a few exceptions. Only 18% of CDC's RCS revenues were from interactive services in 1977.

EXHIBIT V-1

EQUIPMENT MANUFACTURERS OFFERING REMOTE COMPUTING SERVICES IN EUROPE,
1977 (\$ MILLION)

COUNTRY	IBM		HIS		CDC	
	INTER-ACTIVE	REMOTE-BATCH	INTER-ACTIVE	REMOTE-BATCH	INTER-ACTIVE	REMOTE-BATCH
FRANCE	\$ 6.0	\$ 14.0	\$ 11.5	\$ +	\$ 0.4	\$ 3.8
WEST GERMANY	3.5	12.5	5.5	+	0.3	3.2
U.K.	5.0	10.0	17.5	0.2	0.5	4.1
ITALY	3.9	7.9	6.2	+	0.2	3.7
SWEDEN	0.4	3.7	2.3	+	0.2	1.9
BELGIUM	3.7	3.3	3.4*	2.4*	1.8	1.8
NETHERLANDS	3.8	4.6	5.1	+	1.3	3.4
OTHERS	3.7	4.0	7.0	0.4	0.3	3.1
TOTAL	\$30.0	\$60.0	\$58.5	\$3.0	\$4.6	\$ 25.0

NOTE: (1) - ALL OF THESE VALUES ARE INPUT ESTIMATES

(2) - • = CIG/GTS

- Between the three of them, they accounted for 47% of the European interactive market, 17% of the remote batch market and 25% of the total RCS market in 1977.

B. COMPANIES WITH A EUROPEAN AMBITION

I. BRIEF PROFILES

- A large number of European and U.S. vendors have begun to establish themselves in Europe with the intention of developing an international service. Their success so far has been varied.
- TYMSHARE has successfully established a group of associates which distribute Tymshare services:
 - Segi-Tymshare - 45% owned by Tymshare covers Southern Europe (France, Belgium, Italy, Spain, etc.).
 - Tymshare U.K. - 66 2/3 percent owned by Tymshare, 33 1/3 percent owned by Unilever. Covers the U.K.
 - Taylorix-Tymshare - 65% owned by Tymshare, 35% owned by Taylorix. Active primarily in Germany.
 - Sligos - 20% owned by Tymshare, 80% by Credit Lyonnaise. Active in France.
- GSI (France) itself owned by Societe Generale (24%) and CGE (52%) has ambitions of being No. 1 in Europe and has embarked on an aggressive acquisition program: in 1975 they acquired the German DATEL group; in 1977 they bought CRC (UK) and in 1978 they added Interdata (Benelux).

- CISI (France) the largest European computer services company with massive sales of its own (\$83.5 million in 1977), bought SIA (U.K.) in 1974 and has successfully merged the two operations. Since then, no further expansion has occurred.
- National CSS has been slowly extending its operations into Europe using the U.K. (CSS International) as its base of operations. A French office (CSS France) has been opened also.
- Atkins On-Line, the vehicle for On-line's operations in Europe, has developed substantial penetration of the U.K. market and is examined in detail overleaf. The Dutch office has no appreciable influence on the balance sheet so far, however.

2. DETAILED PROFILES

- Detailed profiles of these companies follow:
 - ADP Network Services Ltd.
 - Atkins On-Line Ltd.
 - Comshare Limited
 - University Computing Company

DETAILED COMPANY PROFILE

ADP NETWORK SERVICES INT'L.
179/193 Great Portland Street
London WIN 5TB
(01) 637-13-55

Brian Tytherleigh, Managing Director
Total employees (Europe): 270
Total sales 1977 (est.): \$15 million
Fiscal year ending 30th June

THE COMPANY

- The merger in July 1976 of Time-sharing Ltd. (TSL) and Cyphernetics' European operations formed the basis of ADP Network Services International. TSL, formed in 1967, was partially acquired by Delos in 1969 (and wholly in 1972) and was acquired by ADP in April 1976. ADP bought Cyphernetics in 1975.
- European operations, trading as ADP Network Services International, are headed by Brian Tytherleigh. There are four other International Group companies which are organizationally separate from ADP Network Services International.
 - ADP Commercial Ltd. (formerly Management Dynamics and part of ADP Commercial Services International).
 - ADP Dealer Services Ltd. (motor trade).
 - ADP Benelux (formerly I.E.A. and part of the Commercial Service Group).
 - Systems S.A. Brazil.

Note: ADP Network Services Ltd., formerly TSL, is from 1978 part of ADP-NSI.

These four companies have common financial, personnel, marketing services, and administration management, but their own marketing, sales and support staff. Customer services are also pooled (e.g., collection/delivery, etc.).

- The U.K. interactive activities, while expanding sales rapidly, have suffered from a decreasing net margin. This was particularly true of 1977, when the combined strain of the merger of TSL with Cyphernetics services and rapid growth impacted profit. The European Cyphernetics (i.e., non-U.K.) interactive activities have held up well and are expanding rapidly.
- Total European revenues of ADP-NS, ADP Ltd., and the IEA group in Rotterdam (Netherlands) will be approximately \$15 million in the 1977/78 period ending June 30th. This is divided approximately into:
 - \$5 million for I.E.A.
 - \$10 million for Cyphernetics' European operations and for the U.K. (TSL) interactive operations.

These estimates cannot be verified since ADP does not publish a separate accounting breakdown beyond the U.S. 10-K reports. In addition, the Management Dynamics Batch Operation adds approximately \$2 million.

- The European acquisition chronology (so far) in Europe is as follows:
 - 1974 acquired I.E.A. (Holland)
 - 1975 acquired Cyphernetics (through U.S. acquisition).
 - 1976 acquired TSL, U.K. (through Delos in the U.S.).
 - 1977 acquired Management Dynamics, U.K.

KEY PRODUCTS AND SERVICES

- In the business management tool area, ADP offers TSAM (Time Series Analysis), IPL (Information Processing Language), Manager (an MIS package), ORACLE (business planning and control system) BUDGET (budget producing Oracle-based package), FML (a U.S.-developed Oracle-like financial modeling language now being introduced), AMACS (an IR2-based manufacturing control system) and APECS (a project evaluation and control package).
- Data base-oriented systems include the Chase Econometric data base, COMPUSTAT (financial data, updated weekly, on over 3,500 U.S. companies) and EXSTAT (English equivalent).
- Specialist applications include INTEROPT (Linear Programming), CUPID, GINOF and CYPHERGRAPH (graphics packages), Sofdata's numerical control packages (in Italy mainly), simulators and cross-compilers for some makes of minicomputers (including DEC), EXCALIBUR (a survey cross-tabulation package) and SUPSTAT (statistical analysis).
- The main revenue earners are IPL/Manager, TSAM, ORACLE and APECS.

GEOGRAPHIC COVERAGE

- ADP European country coverage is unequal for historic reasons with the main strength in the U.K. and Holland. The full list of access points to the International Network are:
 - UK/Eire: London, Manchester, Birmingham, Durham, Leeds, Edinburgh, Glasgow, Hounslow, Welwyn Garden City, Wakefield, Loughborough, Andover, Bristol, Liverpool and Dublin.
 - Holland: Amsterdam, Eindhoven, The Hague.
 - Belgium: Antwerp, Brussels.
 - Germany: Cologne, Frankfurt, Essen.
 - Italy: Milan, Rome.
 - Switzerland: Zurich

- Two agencies are in operation, one in Ireland and the other in Switzerland (Winter Partners).

SYSTEMS HARDWARE

- Apart from the Cyphernetics processing center in Ann Arbor, Michigan, U.S.A., (to which the central concentrator in The Hague is connected), ADP-NSI's London based center has four dual DEC K110s, each with 384K. Total on-line disc storage is 4.8 billion characters.
- PDP 8s and 11s are used for multiplexing/front ending, and high speed printers are located at nearly all of the continental sites plus Manchester, Birmingham, Glasgow, and Bristol in the U.K.
- In the U.S., 17 DEC 10s are configured as 13 separate systems. Network loading will determine the location of hardware expansion.
- Any teletype compatible terminal or one accepting EBCDIC code can be attached to the ADP network. ADP also rents DEC writer terminals to users.

PRICE HISTORY

- Over the past three years, ADP-NSI has made several price adjustments to its tariff, as follows:
 - As of January 1, 1975, the processing resource unit of the TSL service was restructured, resulting in a 7% average increase to users.
 - On March 1, 1976, the algorithm for charging was changed, which increased charges by 5%.
 - On March 1, 1977, peripheral (terminal, printer) charges were altered, increasing costs by 2-3%.
 - On September 1, 1977, as off-line clients moved on-line, the storage prices were reduced.

PRODUCT AND MARKETING STRATEGIES

- The product strategy of ADP's interactive division is structured around the products in hand which have been acquired through TSL and Cyphernetics. In some cases, a decision must be taken where two products compete for the same market (e.g., Manager (TSL) and IPL (Cyphernetics)). The ADP name has, of course, now replaced the previous trading names of the acquisitions. ADP concentrates on servicing the large users and on the prime application areas. The Cyphernetics operating system is being offered to new accounts.

DETAILED COMPANY PROFILE

ATKINS ON-LINE LTD.

Fourmost House
West Street
EPSOM Surrey
EPSOM 29678

Dr. D. B. Chandler, Managing Director
Owned by OLS Inc.
Total employees: 202
Total computer services sales fiscal 1976: \$4,710,000
Total computer services sales fiscal 1977: \$6,860,000

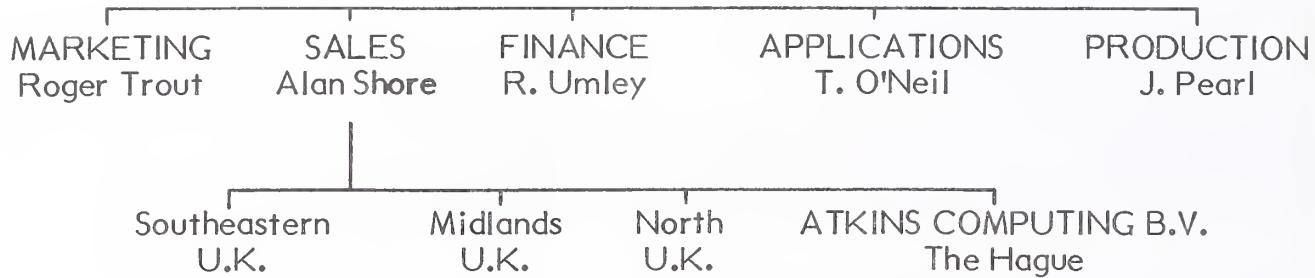
OVERVIEW

- Atkins, one of the largest civil/structural engineering consultancy groups in the U.K. (turnover of \$39.8 million in 1976) began computer service operations in November 1969 with Rank Xerox Sigma 5 computers. In 1971 a Sigma 7 was added and in 1974, the Sigma 5s were replaced by Sigma 9s. In the same year, the seven U.K. offices were added to with the opening of an office in The Hague, Netherlands. Today the total network comprises seven multiplexors, tied into the Sigmas.
- Leasco Response began in April 1970, basing its timesharing services on Hewlett-Packard 2116B minis (four). It was Leasco that provided On-Line's entry into Europe in September 1975, when it was acquired for \$408,000.
- On-Line itself was formed in July 1967 and, initially, offered interactive services on a GE-255. In April 1968, this was converted to a DEC PDP/10, which now has grown to a network of 18 DEC system-10s in the U.S. and a DEC 11/40 front-end processor in the U.K. (four of same in the U.S.).
- The Atkins acquisition cost OLS \$2.2 million in cash and 32,000 OLS shares. The combined Atkins On-Line group turnover in 1977 reached a respectable \$6.9 million, 60% of which was achieved in interactive services, 20% in remote batch, and 15% in batch. The OLS Oliver service contributed nearly \$980,000 of this, while the Atkins group itself provided \$780,000 of internal usage. APL services, financial planning and engineering services formed the remainder in roughly equivalent proportions.

ATKINS ON-LINE ORGANIZATION

- As with all major service organizations, marketing activities are separate from sales, and applications development is separate from production. There is no formal strategy/planning group at corporate level, however.

MANAGING DIRECTOR
Dr. D. B. Chandler



- The full group of offices is now: The Hague, London, Birmingham, Swindon, Cardiff, Warrington, Middlesborough, Epsom, with additional access points in Sheffield, Newcastle, Banbury, Birmingham, Leeds, Loughborough, Fareham, Bristol, and Manchester.

KEY PRODUCTS AND SERVICES

- The product list is a mixture of OLS and Atkins packages but also a high proportion of programs originally developed by major clients that continues to be marketed through the Atkins On-Line network.
- Three groups of services are offered:
 - Computing Services for Management (Financial planning, production scheduling, project control, APL service, information handling, mathematical techniques).
 - Computing Services for Engineers (Finite element systems, off-shore engineering, mechanical and process engineering, environmental engineering and energy conservation, utility programs and programming languages - FORTRAN/APL/BASIC).
 - Computing Services for the Businessman (Accounting packages, sales order processing, systems design and development, and utility programs). Systems design and development is provided for customized solutions.
- The primary tool for problem solving remains Oliver, however, which produced close on £0.5M in 1977.

SYSTEMS HARDWARE/SOFTWARE

- The hardware support for the Atkins On-Line services can, for historical reasons, be divided into two groups:
 - Atkins: In addition to the old RXDS Sigma 7 now switched off and on its way out, Atkins has two RXDS Sigma 9s both with 128K, which are

fed by asynchronous and synchronous channel controllers and three Interdata model 50s. These systems support FORTRAN, BASIC, RPG, APL, COBOL, CORAL.

- OLS: In the U.K., OLS has four H.P. 2116 minis, each with 32KB, and four PDP 11/40s that act as front ends to the U.S. network of 18 DEC System 10s. The H.P. systems support BASIC, COBOL, FORTRAN and APL.
- Terminal support is mainly teletype compatible while remote batch terminals can be DCT 2000, 2780 compatible or most terminals operating under HASP. Telex access is worldwide.

PRICE HISTORY

- Atkins On-Line are constantly re-evaluating their current pricing scheme. While there have been no price increases in storage since April 1974, there have been computer resource unit (CRU) increases resulting in 1975, 1976, and 1977 in costs rising by approximately 4%, 8% and 5% respectively. The CRU itself rose from 11¢ in 1975, to 13¢ in 1976 and to 15¢ in 1977.

PRODUCT AND MARKETING STRATEGY

- It is Atkins On-Line's intention to enter the main European countries in the next two to three years, emphasizing problem solving and their strong consultancy capabilities.
- AOL has a wide variety of packages and products that have "occurred" (rather than resulting from planned developments), but they now have a very comprehensive list of packages with a good image, supported by specialized support people.
- The network will be expanded to improve coverage and support APL, CPA, Oliver and their engineering capability. The more important of the latter will be gradually converted for use of the OLS PDP 10s.

DETAILED COMPANY PROFILE

COMSHARE LIMITED
32-34 Great Peter Street
London SW1
(01) 222-56-65

Ian McNaught-Davis, Managing Director
Owned by Comshare Int'l. B.V.
Total employees: 215 (U.K.)
Total computer services sales fiscal year end 1976: \$7.14 million
Total computer services sales fiscal year end 1977: \$10.88 million

OVERVIEW

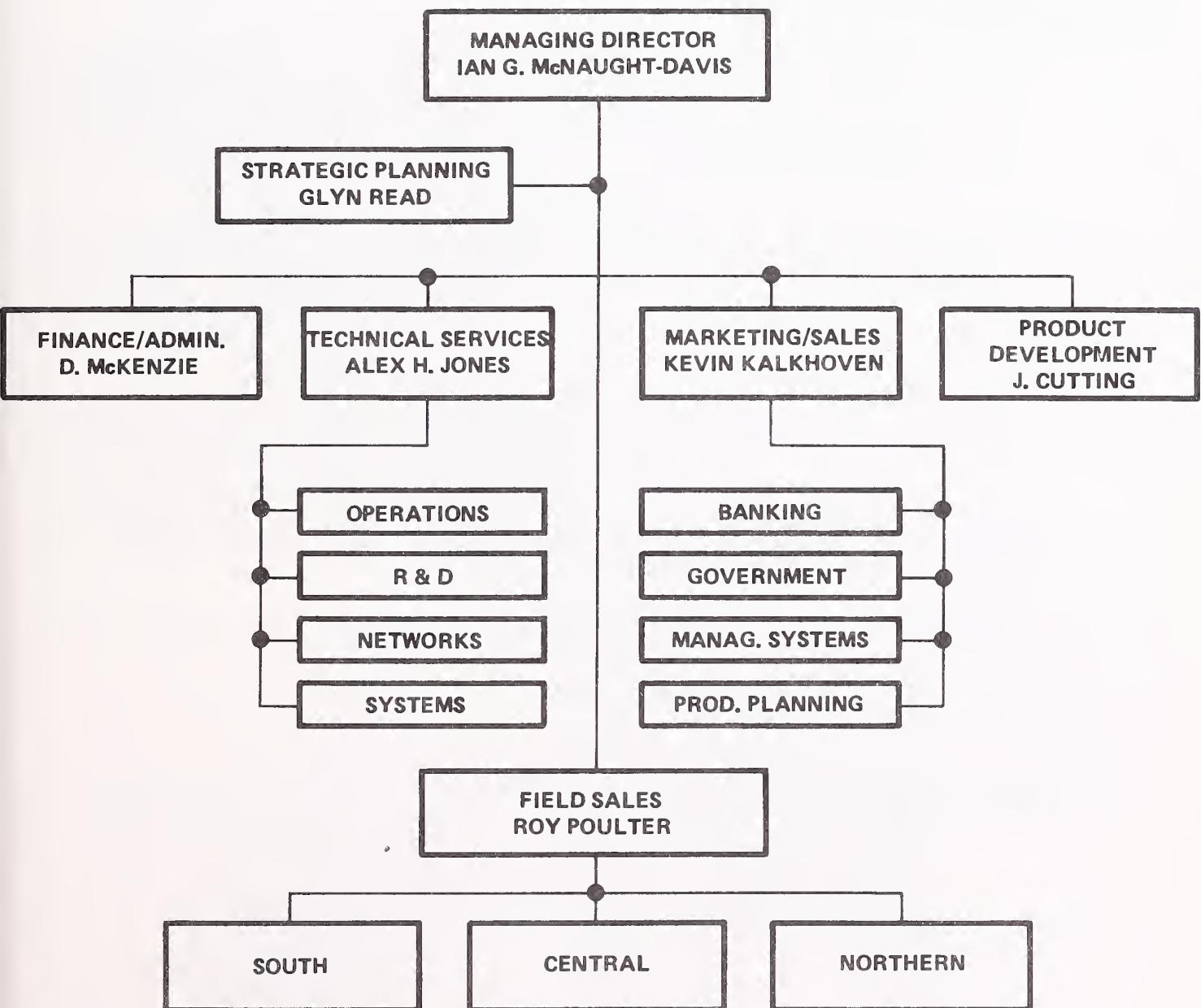
- In Western Europe Comshare Ltd. has grown dramatically since its inception in 1971, initially through competitively priced interactive services, then by the gradual addition of data base management services such as COMPOSIT 77, QUESTOR and TACTICS, then through the third party lease from EPS Consultants of the financial modeling system FCS (which is now used in the U.S. also), and the provision of information data bases (e.g., the PTT tariff data base, the crown copyright census data "-Site-" and the Extel U.K. company data).
- The status of Comshare Ltd. is now that of the prime supplier (though not the largest) of on-line services in the U.K., having largely superceded the stage of simple provision of timesharing. As a result, competition is becoming more and more remote as the services provided become more and more unique. An increasing proportion of business is gained through the integration of industry specialists into the front-end sales effort in the corresponding sector, creating a very respectable image for the company.
- A huge effort has been expended in "hand-holding" and initial systems training of clients who are taught Comshare services and systems, not timesharing techniques. This is beginning to pay dividends now.
- Revenue is mainly produced by encouraging heavy usage of the systems available and not by charging heavily for storage. This is almost the complete reverse of ADP-Network Information Services.
- Comshare is making an effort to focus its resources on specialized markets and applications, maximizing the value-added of each service provided. They take a high profile on things they are good at, actively discouraging those services that they feel are not worthwhile in the long term, (e.g., non-specific timesharing).
- The company is highly people-oriented and attracts many spontaneous job applicants due to its increasingly good image. They do not hire from the

services industry, in general, preferring to increase their industry specialist staff who are then trained intensively (three months).

- This increasing specialization, to a certain degree, insulates the company from the competition.

COMSHARE LTD. (UK) ORGANIZATION

- This is structured around, and in support of, a highly specialized marketing and sales structure, emphasizing the growing dedication of Comshare Ltd. to industry-specific services and products.



U.K. STAFF AND GROWTH

- The U.K. headcount has risen dramatically:

1975	139
1976	170
1977	215

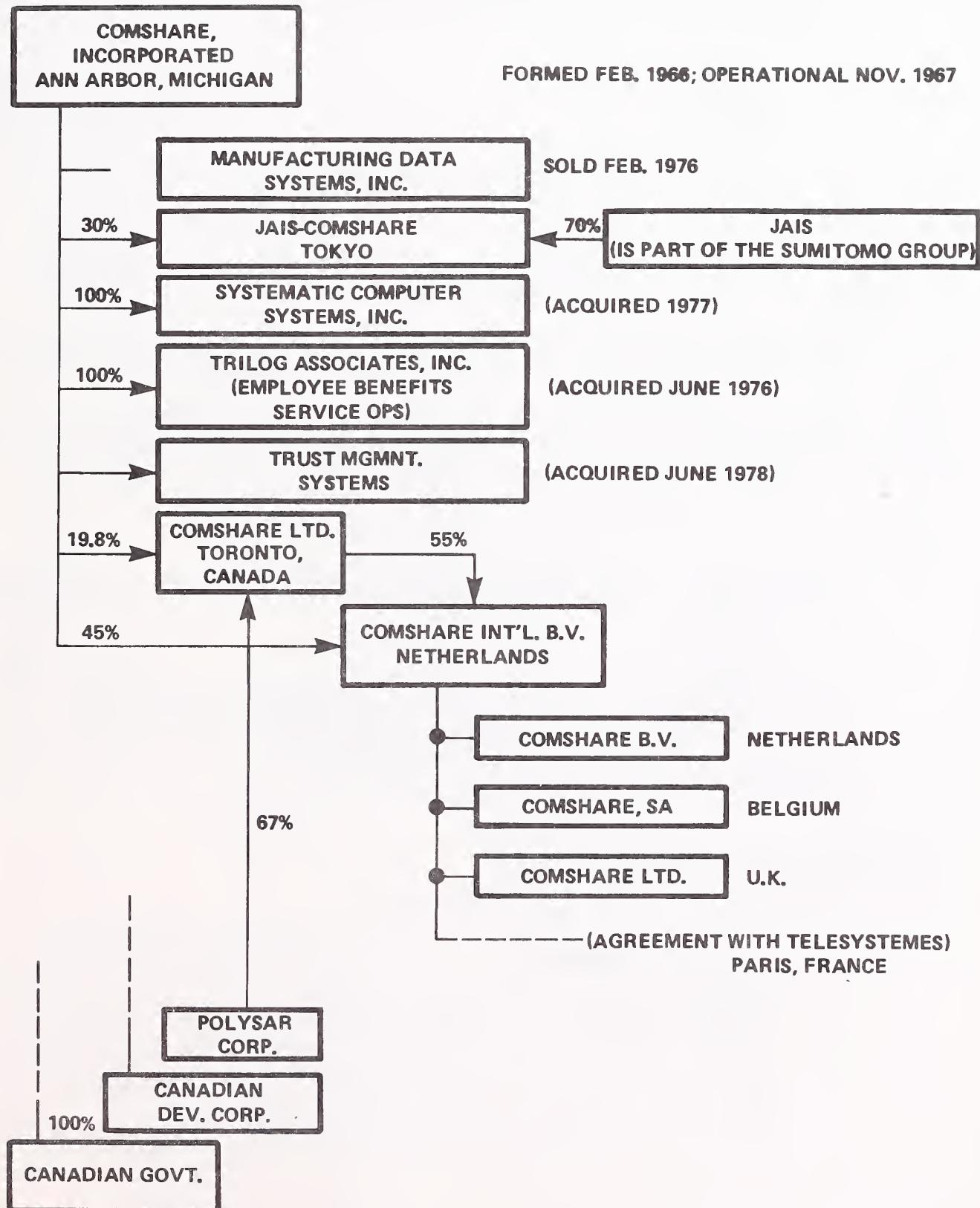
- Revenue has kept pace with this:

1975	\$4.84M
1976	\$7.14M
1977	\$10.88M

KEY PRODUCTS AND SERVICES

- COMMANDER I, Comshare's initial timesharing technology, went live in 1967. (It was sold to Telesystemes in France, who also holds the COMMANDER II license in France). It is supported by ten Xerox 940s in the U.S.. Comshare, Inc. has an IBM System/360 Model 50, and five dual Commander II Systems in Philadelphia.
- Comshare Ltd. (U.K.) has been committed for some time to being number one in the financial planning services market but is now broadening its horizons to choose other markets and become the best in those markets. Comshare Ltd. currently has five Xerox Sigma 9s which will be expanded to six by the end of 1978.
- COMMANDER II is now the only technology offered in Europe, with large C-II systems based on Xerox 9s located in Ann Arbor, Michigan (U.S.A.), Toronto, Ontario (Canada), and London (U.K.). The Tokyo (Japan) center is not connected to the network. Each center supplies power to the national market and is linked to the other centers through the AMBASSADOR service. Large engineering "number-crunching" applications are run on a CDC 6600 in U.S. Steel that ties into the network.
- The network (TELEGRID) is minicomputer based, (90 Interdata I 50s of which 25 are in the U.K.).
- Comshare key product areas are:
 - Financial planning (DATAFORM, FCS, PLANMASTER)
 - Data management systems (COMPOSIT 77, TACTICS, DATAFORM)
 - Materials management (BOSS)
 - Engineering design/scientific (SDRC, IMSL)
 - Personnel reporting and analysis (QUESTOR)
 - Proprietary data bases (SITE, TARIFFICA)
 - Foreign exchange (FEAMIS)

COMSHARE WORLDWIDE



COMSHARE INC., USA

- The Comshare, Inc. parent company, situated at 3001 South State Street, Ann Arbor, Michigan, is a public corporation traded over the counter, employing 450 employees in the U.S. Primarily a remote computing services vendor, Comshare, Inc. had the following growth and U.S. sales over the last three years:

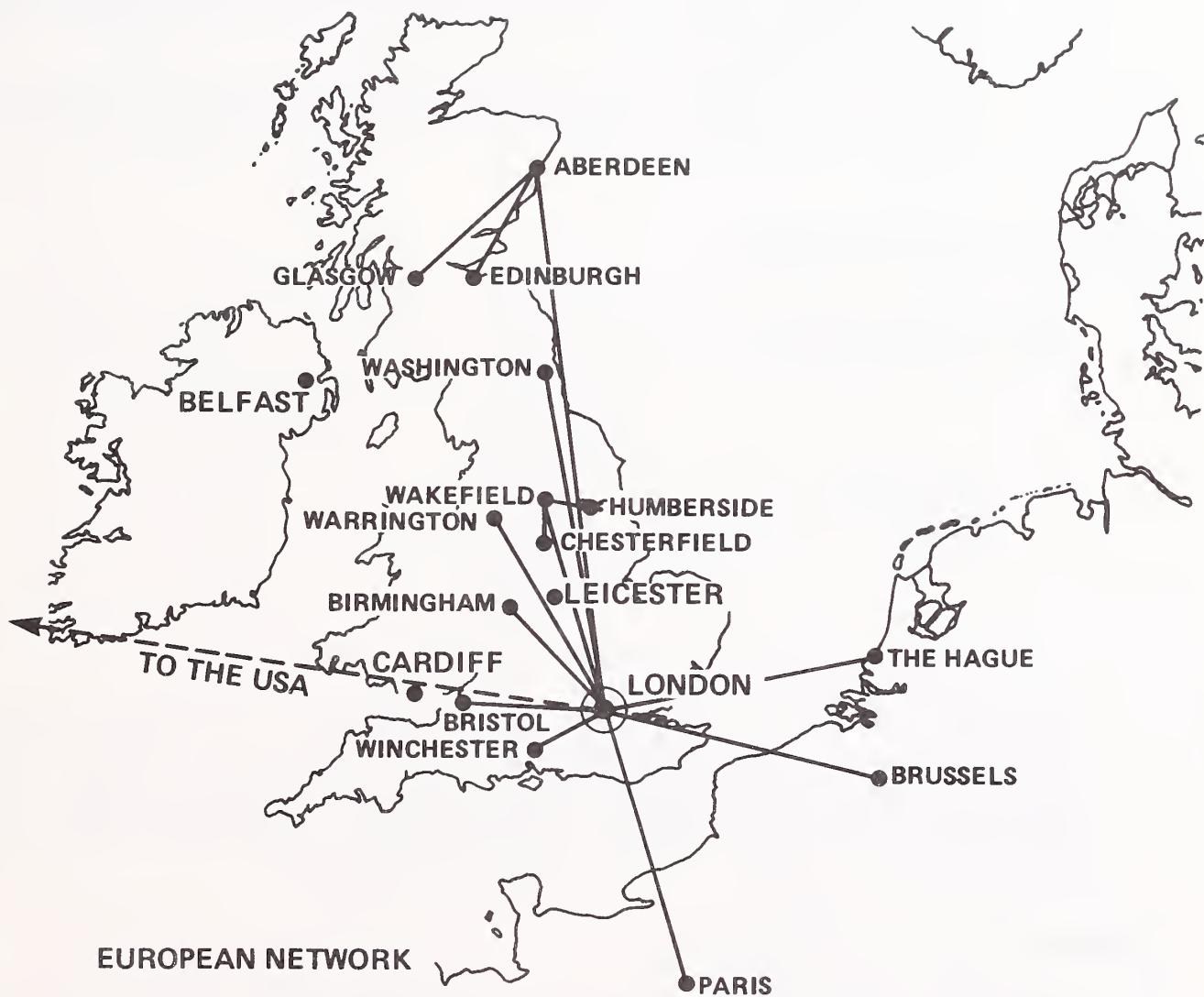
FISCAL YEAR ENDING <u>6/30</u>	<u>U.S. SALES</u>	<u>GROWTH (%)</u>	AFTER TAX EARNINGS (before extraordinary credit)
1975	\$12.3M	-	\$0.76M
1976	\$13.8M	11.4	\$0.72M
1977	\$18.2M	32.9	\$1.475M
1978	\$25.6M	42.0%	\$2.582M

Earnings per share on income before extraordinary credit rose 53% in 1977 from \$.95 to \$1.80 per share with average outstanding shares at 1,800,000.

- Unconsolidated FY 1978 overseas revenue from affiliated companies brought total revenues to \$44 million. Equity in earnings of affiliated companies was \$529,000 in 1978 compared with \$66,000 in 1977.
- Comshare, Inc. leases its office and computer facilities.
- The company has funded joint development of a replacement cost accounting system with Valuation Systems Corp. and subsequently acquired VSC in December 1977.
- In 1975, after Xerox's demise from the computer business, the range of depreciation lives of the computers and communications equipment was extended from 3-10 years to 3-12 years, but the salvage value was cut from 20% to 5%. Software and systems development costs are charged against earnings in the year incurred.

U.S. KEY PRODUCTS AND SERVICES

- Comshare, Inc. specialty products include:
 - COMPASS, generating over \$4 million in revenues. It provides professional accounting services to accounting firms. It is used by over 1,600 accounting firms, including 28 of the 30 largest CPA firms in the country. Comshare, Inc. has been selected by the American Institute of CPA's as the source of professional national program library services. Functions performed include general ledger, project accounting, internal time and billing, staff scheduling, auditing, and tax processing.



- 4.1.1 Systems for Telephone Equipment Inventory and Number Assignment, generating over \$3.5 million. Designed for telephone companies, it balances central switching office traffic and manages, assigns, and forecasts central office equipment. It is used by six of the nineteen Bell Telephone operating companies and by two of the ten major independent telephone companies.
- Human resource management software, PRO/FILES and EBS, generating \$2.3 million revenues. PRO/FILES is a human resource management system designed for personnel managers to create inventories of employee skills, perform statistical analysis, forecast manpower requirements, and prepare reporting information required by the EEO and Affirmative Action. EBS is a product for employee benefit record keeping and administration and is sold primarily to corporate clients and banking institutions.
- Comshare's PARSEC financial products and services, including its replacement cost accounting software, VSCOM-190, generate over \$3.0 million in revenues.

U.S. APPLICATIONS REVENUE

- Specialty applications are Comshare's primary source of domestic revenues in 1977, as shown below:

	<u>1977 \$ U.S.</u>	<u>% Total U.S. \$</u>
Specialty	\$ 8.8M	48%
Data Base Management	5.8	32
Utility	<u>3.6</u>	<u>20</u>
	\$ 18.2M	100%

In 1978, specialty applications were running at 59% of revenues.

- Comshare markets to a wide variety of industries. Its industry-specific accounting and telephone company and trust administration product lines, along with two industry-independent personnel and financial product lines, generated approximately 59% of 1978 revenues. Remaining revenues are derived from generalized and data management services.

COMSHARE LTD. (UK) STRATEGIES

- It has been expected for some time that Comshare must replace its ageing Xerox hardware with one of the major mainframe manufacturers. Initially, IBM System/370 hardware was examined, followed more recently by future series.
- Comshare Ltd. (UK) has also decided that the main revenues growth must come from applications, not from increased volume of processing time sold. The result will be a drive towards specialization of applications offered to

specific branches of industry where they feel that they have in-house competence in the form of consultants with long experience in that field (and not necessarily technical competence in T/S).

- Pricing strategy is, therefore, to offer value-priced services, not cost-priced services. In 1978 prices will not change.
- Marketing/salesmen staff turnover is small - 3%.
- 1978 growth is targeted at 47% over 1977, twice revised upwards from earlier estimates of 38%.

COMSHARE LTD. U.K.

FINANCIAL ANALYSIS

	<u>£ 100</u>		
	<u>1975</u>	<u>1976</u>	<u>1977</u>
<u>TOTAL REVENUE</u>	£ 2,468	£ 3,641	£ 5,550
- Overnight Batch		128	400
- Interactive Services		2,900	4,250
- Remote Batch		200	250
- Belgium		128	200
- Holland		285	450
Pretax Profits	102	367	1,151
Current Assets	745	1,248	1,310
Current Liabilities	734	859	1,509
<hr/>			
Current Assets/Liabilities	1.01	1.45	0.87
Employees	139	170	215
Revenue/Employee	17.76	21.42	25.81

MANAGEMENT DIRECTORY

COMSHARE, INC.

Directors

Richard L. Crandall
President and Chief Executive Officer,
COMSHARE, Inc.
President, Managing Director,
COMSHARE International, BV

Stanley R. Day
Capital Investments Consultant,
Chairman of the Board,
Champion Home Builders

W. John Driscoll
President, Green Valley Holding Co.,
a private investment company

Glenn V. Edmonson
Director, Bio-Engineering, The University
of Michigan

Richard P. Eidswick
Senior Vice President, COMSHARE, Inc.

Brian Sullivan
Partner in Dykema, Gossett, Spencer,
Goodnow & Trigg, Attorneys-at-Law

Robert W. Nolan
President, SCS, Inc.

T. Wallace Wrathall
Vice President, Finance & Administration
Secretary, Treasurer

Jesse W. Caravello
Vice President, Operations

Jerome A. Chessler
Vice President,
Corporate Development

Martin P. Hoffman
Vice President,
Research & Development

Ronald E. Jeffries
Vice President,
Language Development

Paul L. Jones
Vice President,
Financial Product Services

Michael E. McCorry
Vice President, Western Sales

Donald J. Walker
Vice President, Eastern Sales

James G. Wyllie
Corporate Controller

General Legal Counsel
Dykema, Gossett, Spencer,
Goodnow & Trigg
Detroit, Michigan

International Legal Counsel
Baker & McKenzie
Chicago, Illinois

Officers

Richard L. Crandall
President and Chief Executive Officer

Robert G. Boylan
Vice President, Marketing

Donald J. Devine
President, Trilog Division

Richard P. Eidswick
Senior Vice President

MANAGEMENT DIRECTORY (contd)

Auditors

Arthur Andersen & Co.
Detroit, Michigan

Transfer Agent & Registrar

National Bank of Detroit
Detroit, Michigan

**Associate COMSHARE
Operating Companies****COMSHARE Ltd.**
Toronto, Canada

Derek G. Price
President

H. Roger Kirby
Vice President, Marketing

Ronald A. McKerron
Chief Financial Officer

Karl K. Rose
Vice President, Technical

COMSHARE Ltd.
London, England

Ian G. McNaught-Davis
Managing Director

Alex H. Jones
Technical Director

Kevin Kalkhoven
Director

David MacKenzie
Finance Director

Roy Poulter
Director

COMSHARE SA

Brussels, Belgium

Ian G. McNaught-Davis
Managing Director

Kevin Kalkhoven
Director

COMSHARE BV

The Hague, Netherlands

Ian G. McNaught-Davis
Managing Director

Roy Poulter
Director

DETAILED COMPANY PROFILE

UNIVERSITY COMPUTING COMPANY
344-350 Euston Road*
London NW1 3BJ
(01) 679 1766

John Kason, President of UCC International Group, Owned by UCC, Wyley Corp.
Staff: 460
Total sales 1976: \$9.98 million of which \$7.29 million in Bureau Services**
Total sales 1977: \$10.6 million of which \$7.74 million in Bureau Services**

OVERVIEW

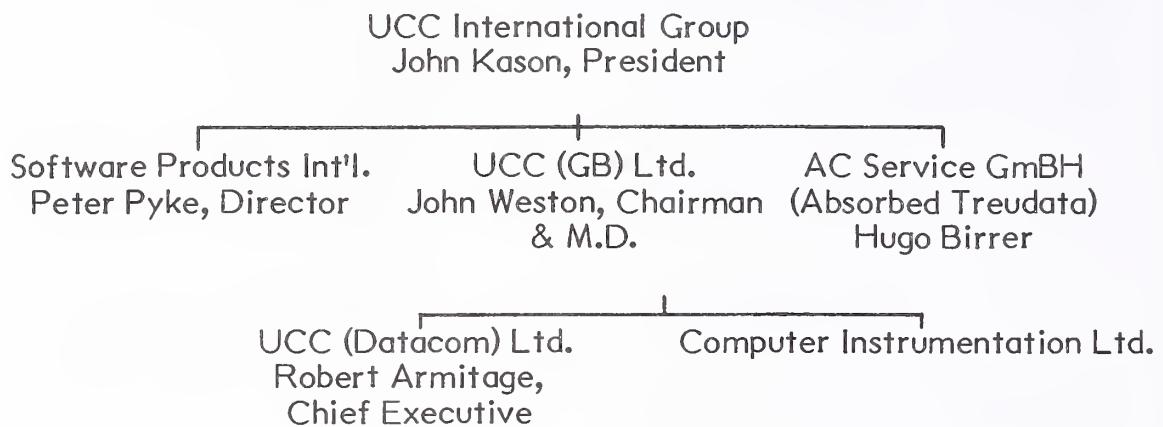
- UCC initially entered Europe through the 1967 acquisition of Computer Services (Birmingham) Ltd. - CSB, and UCC (GB) Ltd. was set up as a result. The original network consisted of service centers in Birmingham and London with a 1004 terminal in The Hague in 1968.
- Automation Centre International (Swiss-based bureau) was acquired in May 1969, adding coverage in Belgium, West Germany, Austria, and Switzerland. In 1974, the Univac 1106-based Wates Computer Services Ltd. was acquired in the U.K. and Riomhaire Teoranta, a univac 1106-based bureau in Galway, Dun Laoire, Shannon, Ireland was added in 1976, rebaptized UCC Datacom Ltd. These two acquisitions added EXEC-8 services to UCC's EXEC-2. In 1978, two significant acquisitions have further extended UCC's capabilities: the U.K. ECL consultants, structural engineers for North Sea Oil platforms, and Treudata of Krefeld in West Germany. Computer Instrumentation Ltd., a manufacturing facility associated with UCC since 1970, was also taken over in 1978.
- UCC has rapidly identified the potential of on-site computer hardware linked to a computer services network and has introduced Service-3, a total service combining VENTEK minicomputers linked to the European Computer Utility Network.
- In 1974, UCC formed its Software Products International Division in Europe to market proprietary system software packages.

* London address. See Geographic Coverage

** INPUT estimate of UCC (GB) only

ORGANIZATION

- Outside of the U.S., services are the responsibility of the UCC International Group headed by John Kason, President.



STAFF AND SALES GROWTH

- Over the last six years the growth of UCC (GB) Ltd., the group in UCC providing remote computing services, has been as follows:

<u>YEAR</u>	<u>STAFF*</u>	<u>SALES (\$M)*</u>	<u>SALES/EMP. (\$K)</u>	<u>ACQUISITIONS</u>
1972	318	5.4	17.0	
1973	311	6.0	19.3	
1974	351	7.8	22.2	Wates C.S. and Datacom
1975	399	9.2	23.1	
1976	435	10.0	23.0	
1977	460	10.6	23.1	

*INPUT estimates of UCC (GB) only

- Sales per employee have been gradually levelling off at around \$23 thousand, well below that of ADP or COMSHARE (closer to double that figure).
- AC Service is predominantly a batch bureau, but added \$3.8 million of remote batch services (out of an estimated \$9.9 million total business sales in 1977).

KEY PRODUCTS AND SERVICES

- UCC coined the computer utility concept (or computing resource), providing processing power to the user community like electricity, through a network of lines. Access to these utility centers occurs in the two classical ways: batch over the counter or remote computing (both remote batch through COPE front ends or interactive through FASBAC front ends). The latter are DEC PDP 8s and 9s.
- Commercial accounting and management science/control services include the standard sales and purchase ledgers, payroll and sales analysis/stock control system plus a mailing system (MAIL-PLAN-3) credit card system on the one hand and more specialized services such as financial modeling/budgeting, optimization of depot, location, market research analysis, typesetting, newspaper accounting, reinsurance accounting, and subscriptions and covenants.
- The real strength of UCC is in engineering and scientific services, including mathematical/statistical services, operational research, a suite of programs for power transmission analysis, oil rig production platform design, numerical control, CAD with graphics, pipe stressing and a wide variety of civil and structural engineering programs.
- A recent success has been TERADYNE's P400 circuit board failure analysis, and the D-LASAR package for logic validation.

SYSTEMS HARDWARE

- There are four major processing centers: Galway, Birmingham, London, and Norbury, all in the U.K. All other service centers tie into these, either directly or via a concentrator.
 - Galway has a Univac 1106 running under Exec 8 and serves the service centers of Shannon, Cork, Galway, and Dublin (via which Galway ties into London). Mainly for batch and RJE.
 - Birmingham has a Univac 1108 under UCC Exec, with a front-end for interactive/RB processing. Serves Manchester and Glasgow in addition to Birmingham.
 - Norbury has a Univac 1108 under UCC Exec, with switched network links to Glasgow, Manchester and Birmingham. Norbury serves the local and London service centers. Mainly batch and RJE.
 - London has dual Univac 1108s with 2IB characters of on-line storage. Front-ends provide for remote computing services. This center is the model support for Paris, Frankfurt, and the Hague, (Antwerp office now closed) and back-up for Galway through Dublin.
- Terminals can be ASCII or EBCDIC compatible for interactive services (10-30cps) and Harris, Incoterm, Data 100, ICL or Singer, Ventek, DEC, Univac 1004 and MDS for remote batch.

- Compilers include FORTRAN IV, ALGOL, COBOL (ASCII & ANSI), BASIC, PL/I and APT.

PRODUCT MARKETING

- UCC has recently signed an agreement with Gemini Computer Systems Ltd. enabling them to offer System 2000 through the Exec 8 service (the DBMS from MRI). This will be a major product for UCC, replacing Univac's DMS 1100.
- As already mentioned, the total service (Service-3) will use minis as small end-user front-ends for periodic peak processing off-loading onto the network. UCC will provide the installation support and programming necessary.

MARKETING STRATEGY

- The aim is to run each UCC service center as a profit center. Commercial applications division has not been a success while technical services have continued to grow without clear guidelines.
- UCC has gradually progressed to the point of offering distributed data entry, and 75% of their clients have RJE terminals in their offices.
- Interactive services represent 10% of UCC's business. Manufacturing is growing in importance and will shortly account for one-third of the total business. Batch revenues continue to progress and represent some 20% of the total.
- Remote batch services are the largest market for UCC and a strong growth area, given the future importance of Service-3.

**VI PROFILE OF A SUCCESSFUL NORTH AMERICAN
RCS VENDOR IN EUROPE**

VI PROFILE OF A SUCCESSFUL NORTH AMERICAN RCS VENDOR IN EUROPE

- The optimum business plan for entry into the European interactive market is highly contingent on the "identity" of the company seeking entry (i.e., the business profile and market expertise that the company has or wishes to project). Thus, each entry plan must, of necessity, be unique. Nevertheless, it is instructive to look at the progress from inception of a business entity which has had to face similar, if not identical, problems to those facing the prospective vendor.
- INPUT has chosen Comshare Ltd. as an example of a company that has "got it right."
- Comshare has been the fastest growing RCS vendor since its formation in 1971. Revenue growth in 1976 was 48% (compared with the U.K. market growth of 30%), as shown in Exhibit VI-1. 1978 growth is targeted at 47%.
- The profit before income tax (PBIT) has steadily increased since 1973; in 1976 wages were 25% of revenue, and revenues per employee was \$35,000. The ratio of net cash flow to capital employed was 23.2%.

A. REVENUE GROWTH

- Revenue dollar volume has leaped from \$6,000 in 1971, to \$7.14 million just five years later with strong growth in staff, hardware assets, profit and market share.
- Comshare has attracted interactive problem solving business by very competitive pricing of financial planning services, storage charges and domestic link charges. However, it has sensibly placed a stiff price on international links, where costs are appreciably higher. This approach of relating prices (revenue) to true costs has been very successful.
- Revenue has been mainly from interactive services (80% in 1976), but an attempt is being made to develop remote batch services using DATA 100 terminals.

B. GEOGRAPHIC COVERAGE/AFFILIATIONS

- Comshare's market expansion is far from complete, with nominal coverage of France (Paris), Belgium (Brussels), and the Netherlands (The Hague). There is no coverage at all of the other major markets (Denmark, Sweden or West Germany). European services are separate from those offered in the U.K., although London is the European HQ.
- U.K. coverage is extensive with offices in London, Aberdeen, Edinburgh, Bristol, Birmingham, Wakefield, Warrington, Washington, Winchester, and Glasgow.
- Its U.S., Canada, and Japan networks can be tied into the European network.

- Comshare is affiliated with Comshare Inc. in Ann Arbor (Michigan) and with Dialog Computing International Ltd. (time brokers in London).
- Comshare International B.V., which reports directly to the U.S. organization, is the Dutch holding company. The ownership is currently being revised. After this revision, all revenues and profits are expected to be consolidated and reported to the U.S. public. In 1977, the U.S. Comshare revenues were \$25 million. The consolidated worldwide revenues would have been \$44 million:
 - Fifty-five percent Polysar (Canadian Development Corp. subsidiary).
 - Forty-five percent Comshare Inc.

C. APPLICATION ORIENTATION AND STRATEGY

- Comshare's main strengths lie in the following applications, by decreasing order of importance to the company:
 - Financial Planning (FCS and COMPLANNER).
 - Data Base Management (COMPOSIT 77, SDRC, TARIFFICA).
 - Stock Control.
 - Foreign Exchange Systems.
 - Personnel Management System.
 - Engineering Services (IMSL).
 - Consolidation Systems (PLANMASTER).

- COMPOSIT 77 stores data in data sets of fixed length records which can interact with each other. Clause structured commands are of English language type. The data bases thus constructed can be accessed by programs written in FORTRAN or COBOL and data set. Hierarchical merging allows consolidation of several data sets.
- FCS has been in use for the last four years and was not developed by Comshare (bought externally). Again it is an English language report generator that produces a model which can be changed without recompilation; FORTRAN and COBOL programs can be run within FCS. This financial modeling system is now also used by Comshare Inc.
- The compilers available include FORTRAN, COBOL BASIC, and D&P (Assembler).
- Marketing strategy is straightforward: leveraging product revenues on widely applicable financial and data base management services by continually expanding the sales force. The following staff distribution demonstrates this:

<u>Staff Function</u>	<u>at 12/31/75</u>	<u>12/31/76</u>	<u>Number</u> <u>% of '76 Total</u>
Data Preparation	6	6	4
Operators	20	21	12
Programmers/Analysts	19	19	11
Sales/Marketing	91	107	63
Administration/Other	20	17	10

- Product development strategy targets other "leverage" type services such as transaction-priced packages and expanded remote batch activity based on DATA 100 terminals. The latter have an excellent reliability image in Europe.

D. HARDWARE USED

- Comshare has kept hardware costs low by buying second hand Xerox Sigma 9s, while keeping storage and processing capacity high. These same processors are used for an overnight batch service, exploiting available resources for revenue generation.
- Communications are based on Interdata model 50s (32-64K) of which there are 19, offering 192 access ports. Lines can be full duplex (for interactive) at 1200 bps or 1200-4800 bps half duplex for remote batch.
- Terminals are not supplied by Comshare, but can be any TTY or 2780 compatible device. TTY-type devices must be ASCII 10, 30 or 50 cps, and DATA 100 remote batch terminals are the recommended 2780-type device.

APPENDIX A: DEFINITIONS

APPENDIX A DEFINITIONS

COMPUTER SERVICES

These are services provided by vendors that perform data processing using vendor computers or assist users to perform such functions on their own computers.

The following are the definitions of the modes of service used in this report:

REMOTE COMPUTING SERVICES (RCS)

- Provision of data processing to a user by means of terminals at the user's site(s) connected by a data communications network to the vendor's central computer. The three sub-modes of RCS are:
 - INTERACTIVE (Time-sharing) is characterized by interaction of the user with the system, primarily for problem solving time-sharing, but also for data entry and transaction processing - the user is on-line to the program/files.
 - REMOTE BATCH is where the user hands over control of a job to the vendor's computer, which schedules job execution according to priorities and resource requirements.

- DATA BASE is characterized by the retrieval of information from a vendor-maintained data base - this may be owned by the vendor or a third party.

BATCH SERVICES

- This includes data processing performed at vendor's sites of user programs and/or data that are physically transported (as opposed to electronically by telecommunications media) to and/or from those sites. Data entry and data output services, such as keypunching and COM processing, are also included. Batch services include those expenditures by users that take their data to a vendor site that has a terminal connected to a remote computer used for the actual processing.

FACILITIES MANAGEMENT (also referred to as "Resource Management" or "Systems Management").

- The management of all or part of a user's data processing functions under long-term contract (not less than one year). To qualify as FM, the contractor must directly plan and control, as well as operate, the facility provided to the user on-site, through communications lines, or in mixed mode. Simply providing resources, even though under a long-term contract, and/or for all of a user's processing needs does not necessarily qualify as FM.

PROFESSIONAL SERVICES

- Management consulting related to EDP, systems consulting, systems design and programming, and other professional services are included in this category. Services can be provided on a basis of: "Time and Materials," whereby the user pays for the time used of an individual on a daily or other fixed rate, or "Fixed Price," where the user pays a fixed fee for a specific task or series of tasks.

SOFTWARE PRODUCTS

- This category is for user's purchases of systems and applications packages for use on in-house computer systems. The figures quoted include lease and purchase expenditures, as well as fees for work performed by the vendor to implement and maintain the package at the users' sites. Fees for work performed by organizations other than the package vendor are counted in professional services. The two sub-categories are:
 - SYSTEMS PACKAGES are operating systems, utilities, and language routines that enable the computer/communications system to perform basic functions. This software is provided by the mainframe manufacturers with their hardware; other vendors provide improved versions of this and special-purpose routines. This classification includes compilers, data base management software, communications packages, simulators, performance measurement software, diagnostic software, and sorts.
 - APPLICATIONS PACKAGES are software that perform processing to serve user functions: They consist of general purpose packages, such as for accounting and inventory controls, and special purpose packages, such as personal trust, airline scheduling, and demand deposit accounting.

PROCESSING SERVICES

- Encompasses FM, RCS and Batch Services: They are categorized by type of service, as distinguished from mode of service, bought by users as follows:
 - GENERAL BUSINESS services are processing services for applications that are common to users across industry categories. Software is provided by the vendor; this can be a complete package, such as a payroll package, or an application "tool," such as a budgeting model, where a user provides much of the customizing of the finished product

it uses. General business processing is often repetitive and transaction oriented.

- SCIENTIFIC AND ENGINEERING services are the processing of scientific and engineering problems for users across industries. The problems usually involve the solution of mathematical equations. Processing is generally problem solving and is non-repetitive, except in the sense that the same packages or "tools" are used to address different, but similar, problems.
- SPECIALTY APPLICATIONS services provide processing for particular functions or problems unique to an industry or industry group. The software is provided by the vendor either as a complete package or an application "tool" that the user employs to produce its unique solution. Specialty applications can be either business or scientific in orientation; data base services where the vendor supplies the data base and controls access to it (although it may be owned by a third party) are also included under this category. Examples of specialty applications are: seismic data processing, numerically-controlled machine tool software development, and demand deposit accounting.
- UTILITY services are those where the vendor provides access to computer and/or communications network with basic software that enables any user to develop its own problem solution or processing system. These basic tools include terminal handling software, sorts, language compilers, data base management systems, information retrieval software, scientific library routines, and other systems software.

**APPENDIX B: CONVERSION RATES USED
IN THIS REPORT**

APPENDIX B: CONVERSION RATES USED IN THIS REPORT

(NB: These may vary considerably with day-to-day rates). To obtain "current" dollar market values, simply convert to local currency using this table's exchange rate and divide by the going rate).

ONE DOLLAR EQUALS:

COUNTRY	RATE	UNIT
• FRANCE	4.74	FRANCS
• FEDERAL REPUBLIC OF GERMANY	2.11	DEUTSCHMARKS
• UNITED KINGDOM	0.51	POUNDS STERLING
• NETHERLANDS	2.27	GUILDER
• SWEDEN	4.65	SWEDISH KRONE
• BELGIUM	32.70	BELGIAN FRANCS
• ITALY	810.00	LIRE

